QSSC-S4R Server System Product Guide

Version 1.0

March 11, 2010

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Version 1.0, February, 2010

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Safety and Regulatory Information

Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions.

Warnings

Heed safety instructions: Before working with your server product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground any unpainted metal surface on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the pins on the board.

Warnings

IMPORTANT ADDITIONAL INSTALLATION REQUIREMENTS FOR CONNECTION TO SINGLE AC SOURCE!

Note: 1. These additional installation requirements ONLY apply when 4 PSU's are connected to a high voltage line (220V or higher).

Note: 2. These requirements DO NOT apply when PSU's are connected to low voltage lines (100-127V and 200V) OR if at least one PSU is connected into a separate AC source (e.g. UPS).

These additional installation requirements are REQUIRED to Avoid Risk of High Leakage Current which may result in Electric Shock.

1. Systems REQUIRE being installed in a location having equipotential bonding
   (such as a telecommunication center, a dedicated computer room or a *RESTRICTED ACCESS LOCATION).

* Definition of RESTRICTED ACCESS LOCATION is a location for equipment where both of the following apply:

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

2. The building installation shall provide means for connection to protective earth as follows: Connection to protective earth can be provided by the socket-outlet that provides power to the PSU. A service person requires checking the socket-outlet to make sure it has a protective earth. If the socket-outlet does not have a protective earth, then the service person requires arranging
    - A protective earth be connected to the socket-outlet; OR
    - Installation of a protective earth conductor to the protective earth terminal location provided. The protective earth connection shall be connected by the protection earth accessory kit provided.

Preface

About this Product Guide

Thank you for purchasing and using the QSSC-S4R Server System.

This manual is written for system technicians who are responsible for troubleshooting, upgrading, and repairing this server chassis. This document provides a brief overview of the features of the chassis, a list of accessories or other components you may need, troubleshooting information, and instructions on how to add and replace components on the QSSC-S4R Server System Product Guide. For the latest version of this manual, see <www.qsscit.com>.

Document Organization

- Chapter 1 provides an overview of the QSSC-S4R Server System. In this chapter, you will find a list of the server board and chassis features, and product diagrams to help you identify components and their locations.
- Chapter 2 describes how to start up and shut down the server.
- Chapter 3 provides instructions for using the utilities that are shipped with the server system or that you might need to download to update the system. This includes how to navigate through the BIOS Setup screens, how to perform BIOS and firmware updates, and how to configure the server management features.
- Chapter 4 provides instructions for adding and replacing hot swappable and serviceable system components and memory DIMMs.
- Chapter 5 provides instructions for adding and replacing processors, memory, boards, and other components that require a certified service technician.
- Chapter 6 provides a description of the BIOS user interface.

At the back of this book, you will find POST code information, safety and regulatory information, and “getting help” information.

Additional Information and Software

If you need more information about this product or information about the accessories that can be used with this server chassis, use the following resources. These files are available at www.qsscit.com.

Table 1. Additional Information and Software

For this information or software	Use this Document or Software
For in-depth technical information about this product, including BIOS settings and chipset information	*QSSC-S4R Server System Technical Product Specification*
If you just received this product and need to install it	*QSSC-S4R Server System Quick Start User's Guide* in the product box
Accessories or other server products	Spares and Configuration Guide
Hardware (peripheral boards, adapter cards) and operating systems that have been tested with this product	Tested Hardware and Operating Systems List
Processors that have been tested with this product	Supported Processors
DIMMs that have been tested with this product	Supported Memory
To make sure your system falls within the allowed power budget	Power Budget
For diagnostics test software	Platform Confidence Tests (PCT)
For drivers	Driver (for an extensive list of drivers available) Operating System Driver (for operating system drivers)
For firmware and BIOS updates	Firmware Update
For software to manage your server	*QSSC-S4R Server System* System Management Software

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Chapter 1: System Description

The *QSSC-S4R Server System* is a 4U, high-density, rack-mount server system with support for one to four Intel® Xeon® 7500 series processors and up to 64 DDR3 RDIMMs / 512GB DDR3 RDIMM memory. The system comes in one of two configurations: an Enterprise SKU and a Value SKU. Shared features include the following:

- Up to four hot swap PCIe add-in cards, or eleven total PCIe add-in cards
- Up to eight hot swappable memory risers carrying up to eight DIMMs each
- Support for up to four multi-core Intel® Xeon® Processor 7500 series
- Support for optional RMM3 installation

The Enterprise SKU includes the following:

- Four hot swap redundant power supply modules
- Eight hot swap redundant cooling fans
- And is configured for:
    - SAS Riser
    - Up to eight hot swap SAS/SATA hard drives

The Value SKU includes the following:

- Two power supply modules
- Four hot swap cooling fans
- And is configured for:
    - Up to six hot swap SATA hard drives via six on-board SATA connectors

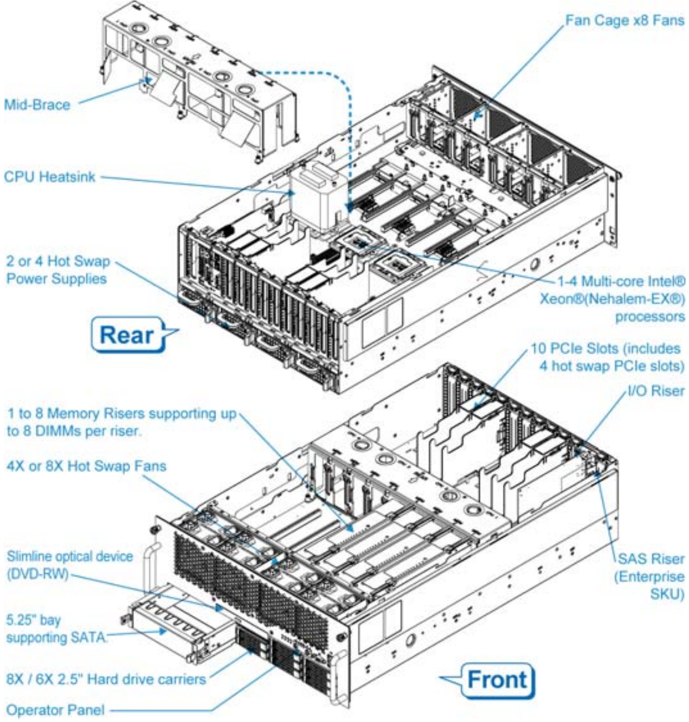

Fan Cage x8 Fans
Mid-Brace
CPU Heatsink
2 or 4 Hot Swap Power Supplies
1-4 Multi-core Intel® Xeon®(Nehalem-EX®) processors
Rear
10 PCIe Slots (includes 4 hot swap PCIe slots)
I/O Riser
1 to 8 Memory Risers supporting up to 8 DIMMs per riser.
4X or 8X Hot Swap Fans
Slimline optical device (DVD-RW)
SAS Riser (Enterprise SKU)
5.25" bay supporting SATA
8X / 6X 2.5" Hard drive carriers
Front
Operator Panel

Figure 1. QSSC-S4R Server System (Enterprise SKU shown)

Note: For SKU details refer to the BOM and your sales representative.

System Features

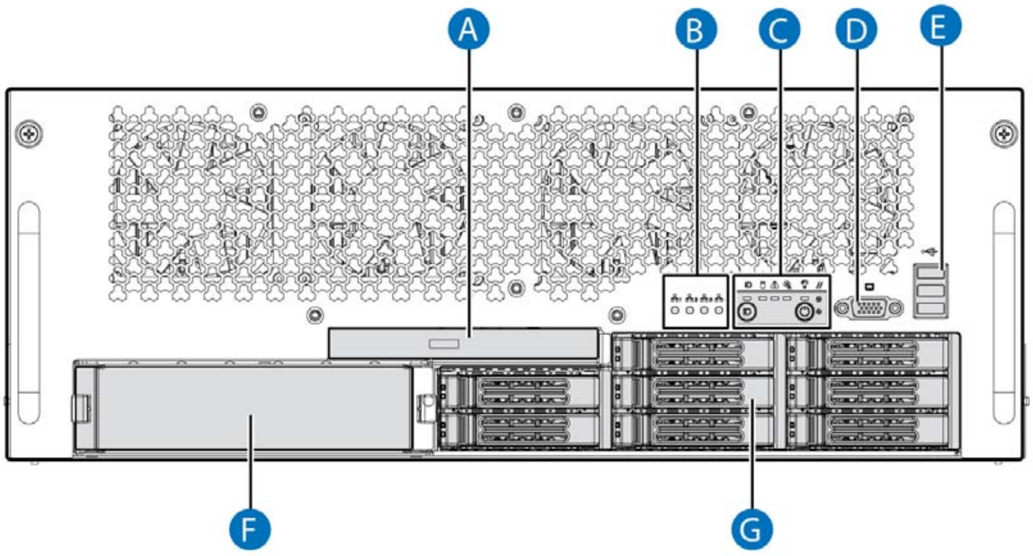
Table 2. Chassis Features

Feature	Description	
Dimensions	Height: 4U / 6.8 inches (173.8 mm) Width: 16.7 inches (424 mm)	Depth: 27.7 inches (704 mm) Weight: 110.23 lbs (50 kg) – estimated
Clearance requirements	Front Clearance: 3 inches (76 mm) Side Clearance: 1 inch (25 mm) Rear Clearance: 6 inches (152 mm)	
Scalability	• One to four processors supported • Supports two generations of processors; Intel® Xeon® 7500 series processors and its next generation • SAS Riser: 6 Gb SAS RAID card • Up to eight 2.5 inch SAS/SATA hard drives • Up to eleven PCIe adapters (Including the SAS Riser) • Up to 512GB DDR3 RDIMM memory support (16GB/QRx4 RDIMM x 32 or 8GB/DRx4 RDIMM x 64) • Intel® Remote Management Module 3	
Serviceability	• Front access to hot swap hard disk drives • Easily maintained hot swap fans with individual LED indicators • Rear access hot swap power supplies with LED indicators • System power and system status LEDs • System ID buttons and LEDs on front panel and rear of system • LED indicators for PCIe hot-swap operations • Memory configuration and status LEDs, located on memory riser modules • Processor and IOH failure LEDs (CSS LEDs), located on the main board • Color-coded parts to identify both hot swap and non-hot swap serviceable components	
Availability	• Eleven PCIe slots (including one SAS riser slot), with four slots supporting hot-swap • Four 850W high efficiency power supplies in a redundant (2+2 or 3+1) configuration • Eight hot swap system fans in a redundant (7+1) configuration or four hot swap fans in a non-redundant configuration • Eight hot swap 2.5-inch SAS/SATA hard disk drives • Eight memory risers • SAS Riser supporting RAID with optional battery backup for storing buffer data.	
Manageability	• Server Management support via Intel® Remote Management Module 3 (RMM 3) • Remote management • Intelligent Platform Management Interface (IPMI) 2.0 compliant • Wired for Management (WfM) 2.0 compliant • Remote diagnostics support • BMC baseboard management controller	
Front Control Panel and Operator Panel	• System power button and LED • System reset button • NMI button • System ID button and LED • System status LED	• Hard drive status LED • LAN1, LAN2, LAN3 and LAN4 status LEDs • Video connector • Three USB 2.0 ports • Fan status / fault LED
Rear I/O	• Four GbE LAN ports • One I/O riser Management Ethernet Port via Intel® RMM3 (optional in Value SKU) • Video connector • Serial port connector	• System status LED • Fan status / Fault LED • CSS LED • System ID button and LED • Two USB 2.0 ports • POST code LEDs

System Front

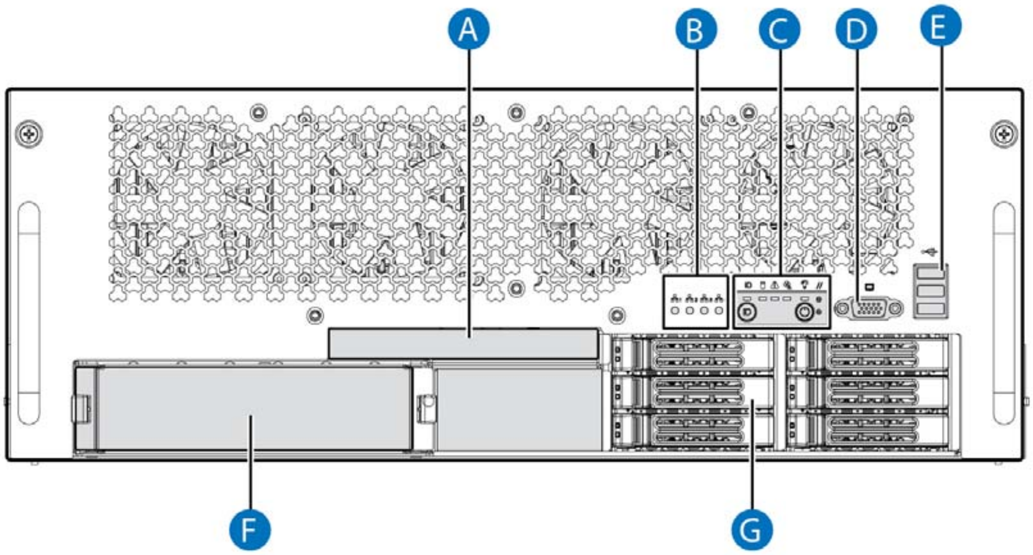
Figure 2 shows the front view of the system. The front provides access to the following components:

- Front panel buttons and LEDs
- User accessible VGA connector supporting 1280 x 1024 resolution
- 3 USB 2.0 connectors
- Hard drive, optical drive, and tape backup drive



Item	Description
A	Optical Disk Drive
B	Rear LAN LEDs (from I/O Riser)
C	Operator Panel
D	Video Connector
E	USB 2.0 ports
F	5 ¼ - inch peripheral bay (SATA cable installed in Enterprise SKU)
G	Hot swap hard drive bays

Figure 2. Front Components (Enterprise 8 HDD SKU)



Item	Description
A*	Optical Disk Drive Bay (empty)
B	Rear LAN LEDs (from I/O Riser)
C	Operator Panel
D	Video Connector
E	USB 2.0 ports
F*	5 ¼ - inch peripheral bay (SATA cable not included with system)
G	6 Hot swap hard drive bays

* These peripherals are not supported in Value SKU systems unless a SATA hard drive bay is sacrificed and suitable cabling installed.

Figure 3. Front Components (Value 6 HDD SKU)

Operator Panel / Front Control Panel

The front panel contains the following:

- Operator Panel with system control buttons and LED status indicators. For more information on the operator panels, refer to “Operator Panel“ on page 28.
- Four LED status indicators for the rear LAN ports
- One video connector supporting 1280 x 1024 resolution
- Three USB 2.0 ports

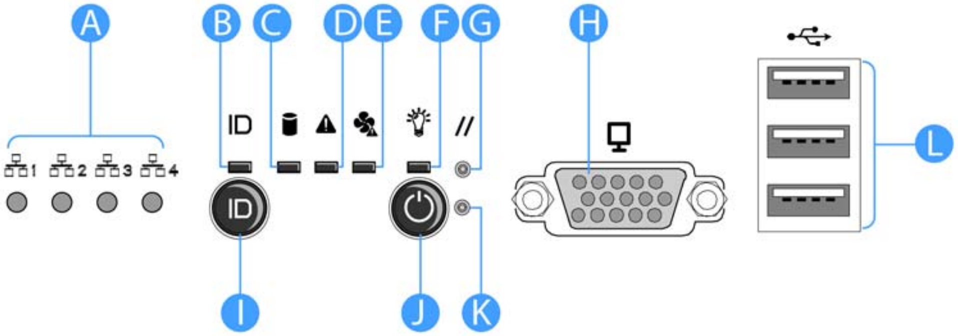


Figure 4. Operator Panel Controls and Indicators

Table 3. System Status LED States and Operator Panel Controls

Item	Feature	Description		
Operator panel buttons and LED indicators				
A	LAN1, LAN2, LAN3, LAN4 status LEDs (green)	Indicates LAN activity status		
		Color	**LED Behavior**	**Description**
			Off	Idle
		Green	Blinking	LAN access
		Green	On	LAN link/no access
B	System ID LED (blue)	Blue ID that identifies the system through server management or locally		
C	Hard drive status LED (green)	Indicates hard drive activity and fault status		
		Color	**LED Behavior**	**Description**
		Green	Blinking	HDD access or spin up/down (*see note below)
			Off	No access and no fault
D	System status/fault LED (green/amber)	Indicates system status		
		Color/LED Behavior	**State**	**Description**
		Off	Not ready	AC power off, POST error
		Green – On	Ready	System booted and ready
		Green – Blinking	Non-critical Alarm	• Non-critical temperature threshold asserted. • Non-critical voltage threshold asserted. • Non-critical fan threshold asserted. • Fan redundancy lost, sufficient system cooling maintained. (This does not apply to non-redundant systems.) • Power supply predictive failure. • Power supply redundancy lost. (This does not apply to non-redundant systems.)

		Amber – Blinking	Non-Fatal Alarm	• CATERR asserted. • Critical temperature threshold asserted. • Critical voltage threshold asserted. • Critical fan threshold asserted. • VRD hot asserted. • SMI Timeout asserted.
		Amber – On	Critical alarm	• CPU Missing. • Thermtrip asserted. • Non-recoverable temperature threshold asserted. • Non-recoverable voltage threshold asserted.
E	Fan fault LED (amber)	Amber – Fan fault		
F	System power LED (green)	Indicates system power status		
		Color/LED Behavior	**State**	**ACPI**
		Off	Power Off	No
		Green – On	Power On	No
		Off	S5	Yes
		Green – Blinking	S1	Yes
		Green – On	S0	Yes
G	System reset button	Resets the system		
I	System ID button	Toggles ID LED		
J	System power button	Toggles system power		
K	NMI button	Asserts NMI		
Front Panel Connectors				
H	Video connector	Video port, standard VGA compatible, 15-pin connector (1280 x 1024 resolution support)		
L	Three USB connectors	Three USB 2.0 ports, 4-pin connectors		

System Rear

Figure 5 shows the rear view of the system. User-accessible connectors, PCIe slots, and power supply modules are located at the rear of the system. These components are described in the following sections.

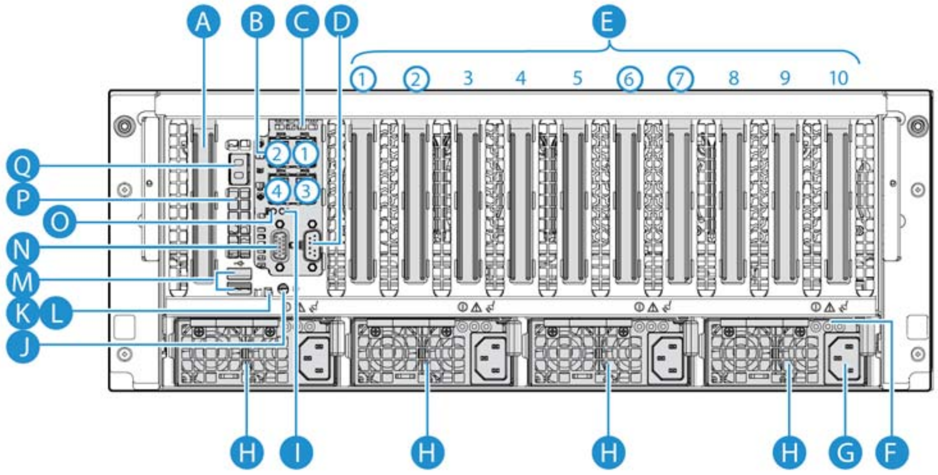


Figure 5. System Rear (Enterprise SKU shown)

Table 4. System Rear Items and Descriptions

Item	Description			
A	SAS Riser Slot	PCIe Gen-2x8, ½ length, x8 connector		
B	I/O Riser Quad Gigabit Ethernet Ports: Four LAN ports, RJ45 connector. From upper right: LAN 1 and 2; and LAN 3 and 4 at the bottom			
	LAN port LED:			
	Status LED – Green	On – Ethernet link is detected Off – no Ethernet connection Blinking – Ethernet link is active		
	Speed LED – Green/Amber (dual color)	Off – 10 Mbps Green On – 100 Mbps Amber On – 1000 Mbps		
C	I/O Riser Module			
D	Serial Port Connector			
E	Slot 1	PCIe Gen-2x8, ¾ in. x8 conn., hot swap	Slot 6	PCIe Gen-2x8, ¾ in., x8 conn., hot swap
	Slot 2	PCIe Gen-2x8, ¾ in. x8 conn., hot swap	Slot 7	PCIe Gen-2x8, ¾ in., x8 conn., hot swap
	Slot 3	PCIe Gen-2x4, ½ in., x8 conn.	Slot 8	PCIe Gen-2x4, ¾ in., x8 conn.
	Slot 4	PCIe Gen-2x4, ½ length, x8 conn.	Slot 9	PCIe Gen-1x4, ½ in., x8 conn.
	Slot 5	PCIe Gen-2x16, ¾ in., x16 conn.	Slot 10	PCIe Gen-1x4, ½ in., x8 conn.
	*NOTE: Legacy I/O devices i.e. video cards are only supported on slot #1, 2, 3, 4 or 10			
F	PSU Status LEDs. See "Power Supply Modules" on page 12 for details.			
G	AC input power connector (4 bays, from right to left: PSU#1, PSU#2, PSU#3, PSU#4)			
H	Hot swap power supply			
I.	Fan Fault LED (Amber)			
J	System ID Button			
K	System Status/Fault LED			
L	System ID LED: Blue ID that identifies the system through server management or locally			
M	USB 2.0 ports (x2)			
N	VGA video port - standard VGA compatible, 15-pin connector supporting up to 1600X1200 resolution			
O	CSS LED (Customer Self Service) (Yellow)			
P	8x POST code LEDs. See Appendix A: POST Codes on page 157 for details			
Q	I/O Riser Management Ethernet Port (Intel RMM3) – Optional			

Processors

One to four Intel® Xeon® Processor 7500 series are supported. When a single processor is installed, it must be installed into CPU Socket 1.

System Memory

The memory risers connect to the main board through 8 PCI Express (PCIe) connectors. One to eight memory risers can be installed via PCIe x24 card edge connectors. Memory air baffles are needed to restrict airflow to empty memory riser slots. Key features of the memory risers are discussed in "Memory Riser" on page 23.

QSSC-S4R supports only DDR3 registered DIMMs. Based on the Intel® 7500 Chipset, the system will provide one set of RAS questions in BIOS Setup and will configure common RAS across Sockets. QSSC-S4R supports the following memory RAS (Reliability, Availability and Serviceability) features:

- Lock Step mode
- Interleaving
- Mirroring Mode
- Sparing Mode
- Hemisphere Mode

For detailed description of each RAS mode and configuration examples, refer to the *QSSC-S4R Technical Product Specification*.

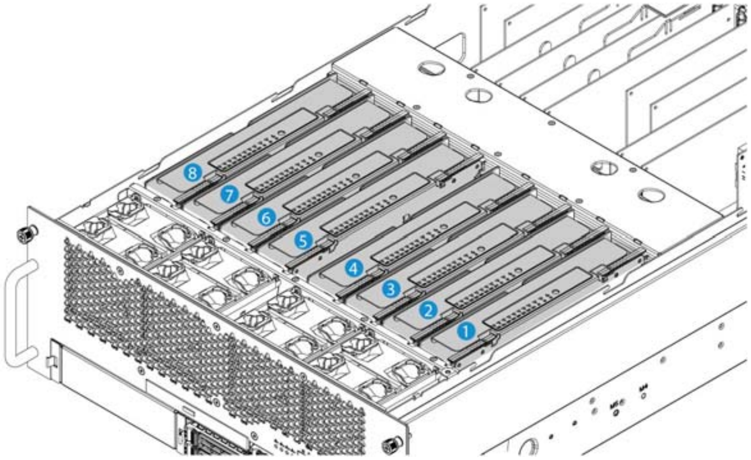


Figure 6. Memory Riser Locations and Numeration

Power Subsystem

The power subsystem consists of:

- Power supply modules (PSU)
- A power distribution board (PDB)

The power supply subsystem can support up to 4 PSU which all connect to the PDB.

The total system is rated 100-127/200-240V AC, 50/60 Hz, 28/14A. The minimum system configuration requires installation of at least two PSU's. The PSU is considered hot-swappable. The system can be configured to support *True AC redundancy or non-AC redundancy.

*Note: *True AC redundancy is recommended for systems used for critical business applications. This will result in the system to continue operation during a power failure as the redundant part of the subsystem is plugged into a separate AC source [e.g. Un-interruptable Power Supply (UPS)).*

Note: Refer to Tables below for maximum DC loading for both AC redundant and AC non redundant configurations.

INSTALLATION REQUIREMENTS FOR AC REDUNDANT CONFIGURATIONS

The minimum AC redundant configuration is with one PSU plugged into a main AC source, and the second PSU plugged into a separate AC source (e.g. UPS).

The maximum AC redundant configuration is with two PSU plugged into a main AC source and two other PSU's plugged into a separate AC source (e.g. UPS)

Table 5. Maximum DC Loading Requirements

1 +1 (2 PSU)	830W	Yes DC Redundancy
2+2 (4 PSU)	1580W	Yes DC Redundancy

INSTALLATION REQUIREMENTS FOR AC NON REDUNDANT CONFIGURATIONS

For systems not requiring AC redundancy, the power supply subsystem can be installed with up to 4 PSU's. The PSU's can be connected to a single or multiple AC sources.

Table 6. Maximum DC Loading Requirements

1+0 (1 PSU)	830W	No DC Redundancy
2+0 (2 PSU's)	1580W	No DC Redundancy
1+1 (2 PSU's)	830W	Yes DC Redundancy
3+0 (3 PSU's)	2320W	No DC Redundancy
2+1 (3 PSU's)	1580W	Yes DC Redundancy
3+1 (4 PSU's)	2320W	Yes DC Redundancy

Note: Quanta does not validate 1+1 (2 PSU) or 2+1 (3 PSU) with DC Redundancy scenarios. ONLY 2+2 or 3+1 (4 PSU) is supported for DC Redundancy.

IMPORTANT ADDITIONAL INSTALLATION REQUIREMENTS FOR CONNECTION TO SINGLE AC SOURCE!

*Note: 1. These additional installation requirements ONLY **a**pply when 4 PSU's are connected to a high voltage line (220V or higher).*

Note: 2. These requirements DO NOT apply when PSU's are connected to low voltage lines (100-127V and 200V) OR if at least one PSU is connected into a separate AC source (e.g. UPS).

Warning *These additional installation requirements are REQUIRED to Avoid Risk of High Leakage Current which may result in Electric Shock.*

*1. Systems REQUIRE being installed in a location having equipotential bonding (such as a telecommunication center, a dedicated computer room or a *RESTRICTED ACCESS LOCATION.*

** Definition of **RESTRICTED ACCESS LOCATION** is a location for equipment where both of the following apply:*

- *Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and*
- *Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.*

2. The building installation shall provide means for connection to protective earth as follows: Connection to protective earth can be provided by the socket-outlet that provides power to the PSU. A service person requires checking the socket-outlet to make sure it has a protective earth. If the socket-outlet does not have a protective earth, then the service person requires arranging

- *A protective earth be connected to the socket-outlet; OR*
- *Installation of a protective earth conductor to the protective earth terminal location provided. The protective earth connection shall be connected by the protection earth accessory kit provided.*

Three power supply module are capable of handling the maximum power requirements for a fully configured QSSC-S4R Server System, which include the following:

- Four processors
- 512GB of memory
- Eleven PCIe add-in cards (including the SAS RAID riser)
- Eight hard disk drives
- One optical drive
- One tape drive

The table below describes the maximum system support under each configuration SKU:

Table 7. Maximum System Configuration Support

	Enterprise SKU (8x HDD)		Value SKU (6x HDD)
Processors	4	4	4
Memory Risers	8	8	4
DIMM Rank/DIMM Qty	QR/32 (8 Memory Risers with 4 DIMMs on each riser)	QR/64** (8 Memory Risers with 8 DIMMs on each riser)	QR/32 (4 Memory Risers with 8 DIMMs on each riser)
IO Riser	Yes	Yes	Yes
SAS Riser	Yes	Yes	No
Hot Swap/Total PCIe*	4/10	4/10	0/5
System fans	7+1	7+1	4+0
2.5” HDDs	8	8	6****
Optical Device	Yes	Yes	No
5.25” Tape Device	Yes	Yes	No
Power Supply	2+2	3+1	2+0
12V Available Power	1660W	2300W	1660W
Power Redundancy	AC/DC	DC Only***	AC Only*****

*Exclude SAS riser slot.

**Some QRx4 configurations like > 32 DIMMs will have thermal limitations and so will throttle memory subsystem.

***Refer to “AC Redundant and Non-Redundant Operations” in the following section.

****Will support 6 SATA drives without an optical device or tape device or 5 with a slim-line optical device or tape.

***** Refer to “AC Redundant and Non-Redundant Operations” in the following section.

When the system is configured with four power supply modules, the hot swap feature allows the user to replace a failed power supply module without affecting the system functionality.

A 3-volt lithium battery provides power to the RTC when the Main Board is powered down. The expected battery life is greater than 5 years.

AC Source Related Power Supply Configuration and System Load Limits

The system configuration and load is limited by the number of AC mains power sources available as indicated in the following table.

Warning *To Maintain Safety Compliance - Systems installed using high line AC Voltages (e.g. 220-240V~) REQUIRE (1) being installed in a location having equipotential bonding (e.g. telecommunication center; dedicated computer room or a RESTRICTED ACCESS LOCATION); and (2) a service person check to make sure the out-let socket providing power to the system has protective earthing; and (3) if socket-outet does not have protective earth the building installation requires providing the system with a separate protective earth connection to the provided protective earth termination of the system; and (4) service persons shall note the high leakage warning on the system and take any necessary safety precautions with respect to potential high leakage hazard. Equipment building installation shall provide means for connection to protective earth.*

Table 8. System Power Supply Configuration and System Load Limits

Number of Power Supply Modules Installed	**AC Redundant Systems (Requires 2 AC Sources)**		**AC Non-Redundant Systems (Connected to 1 AC Source)**	
	Max. DC Loading to Support AC Redundancy	**Installation Requirements**	**Max. DC Loading for AC Non-Redundant Systems**	**Installation Requirements**
1	NA	NA	830 W	1 PSU connected to mains (1+ 0)
2	830 W	1 PSU connected to mains 1 PSU connected to an isolated AC source. E.g UPS (1+1)	1580 W	2 PSUs connected to mains (2+0)
3	NA	NA	2320 W	3 PSUs connected to mains (3 + 0)
4	1580 W	2 PSUs connected to mains 2 PSUs connected to an isolated AC source. E.g. UPS (2+2)	2320 W	4 PSU connected to mains. (4 + 0)

Power Supply Modules (PSU)

The QSSC-S4R hot-swap power supply modules are rated at 100 -127/200 - 240V AC, 50/60 Hz, 28/14 A. The output rating of each power supply is 850 watts when operated between 200 VAC and 240 VAC. Modules are current-sharing and have auto-ranging input. The power supply modules have universal AC input with Power Factor Correction (PFC) Distributed Power Supplies (DPS). The AC input receptacle is an IEC-320 C14 15A rated for a 250 VAC minimum.

The power supply operates over the range and limits shown in the following table.

Table 9. AC Input Rating

Parameter	Minimum	Nominal	Maximum	Start Up VAC	Power Off VAC
Voltage (115)	90 Vrms	100-127 Vrms	140 Vrms	85 VAC +/-4 VAC	75 VAC +/-5 VAC
Voltage (220)	180 Vrms	200-240 Vrms	264 Vrms		
Frequency	47 Hz	50/60	63 Hz		

When input power is applied to the power supply, any initial current surge or spike of 10 ms or less should not exceed 55A. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10 ms, and less than 150 ms, must not exceed 25A.

The power supply has DC outputs of 12 V and 3.3 VSB. The 12 V main power is distributed through the server and is converted locally at the point-of-load using embedded Voltage Regulator Module (VRM) converters. The power supply is capable of power-safe monitoring.

The DC output voltages remain within the ranges shown in the following table when operating at steady state and dynamic loading conditions. These limits include the peak-peak ripple/noise.

Table 10. DC Output Voltage Regulation Limits

Parameter	Tolerance	Minimum	Nominal	Maximum	UNITS
+12V	-5%/+5%	+11.40	+12.00	+12.60	VDC
+3.3Vstandby	-3%/+5%	+3.20	+3.30	+3.46	VDC

The combined continuous output power for all outputs does not exceed 850W. Each output has the maximum and minimum current rating shown in the following table.

Table 11. 850W Power Supply Load Ratings

Output Level	Minimum*	Nominal*	Maximum*	Peak*
+12V	0A		69A	88A
+3.3V standby	0A		6.0A	

*Note: Values are at the system level. For 2+2/or 3+1 redundant systems, the load each power supply provides is based on its current sharing accuracy.

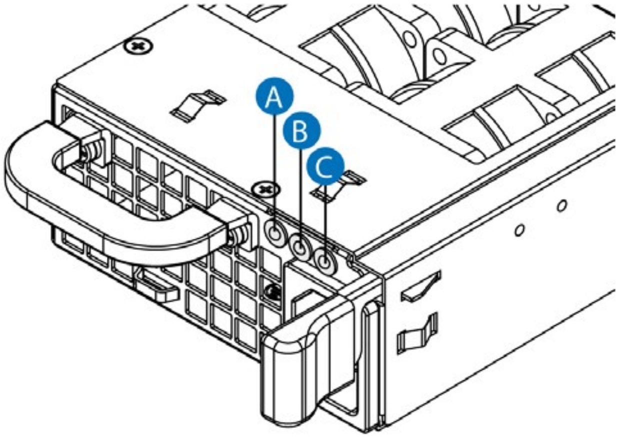


Figure 7. Power Supply Indicators

Note: The cooling system is non-redundant if only two power supplies are installed in the Value SKU.

Caution *Power supplies must be hot swapped within three minutes to prevent overheating. This time period applies only to the time that the power supply is physically removed, not from the time of failure.*

Table 12. Power supply indicators

LED	LED Name	Symbol	Color/LED State	Description
A	DC Power Redundancy status	⏻	Green – Blinking	Cold Redundancy Mode
			Green - On	PSU on and running
B	Power Supply Failures and Warnings	⚠	Amber – Blinking	PSU warning event operation continuing
			Amber – On	PSU critical even shutdown
C	AC Power Supply Input Status	🔌	Green – Blinking	AC power not present
			Green – On	AC power present

Cooling Subsystem

Caution *The chassis top cover must be installed for proper system cooling. Cooling components must be hot swapped with three (3) minutes. This time period applies only to the time that the cooling component is physically removed, not from the time of failure.*

The QSSC-S4R Server system contains two cooling fan zones comprising a total of eight system fans located at the upper front of the system and two dual-motor fans located within each power supply module. The basic chassis structure is divided into a lower section of 1U height and upper section of 3U height.

The upper section is cooled with up to eight 80 mm fans positioned in front of the system exhausting into the memory, CPU, and PCIe regions. The lower section is cooled by fans located within the PSUs drawing air through the hard drives and across the power distribution board.

If eight fans are present the fans are in a redundant configuration and by definition hot swappable. A redundant configuration requires two fans per fan zone (See Figure 9). The default four fans of the Value SKU are NOT hot swappable. To replace the fans during maintenance in a non-hot swappable configuration the system should be powered down and all power supply disconnected.

The eight hot swap fan modules that are located at the upper front of the chassis can be removed from the chassis when the chassis cover is removed (See Figure 8).

The fans are docked on the front panel fan board (FPFB).

The S4R fan modules have following features:

- Form factor: 80x80x38mm
- Hot swap blind-mate connector
- Fan presence, PWM, tachometer, and fault signals
- Support Fault LED
- Hard Disk Drive Rotational Vibration Isolation
- Tool-less service at the module level
- Keying feature to prevent incorrect installation

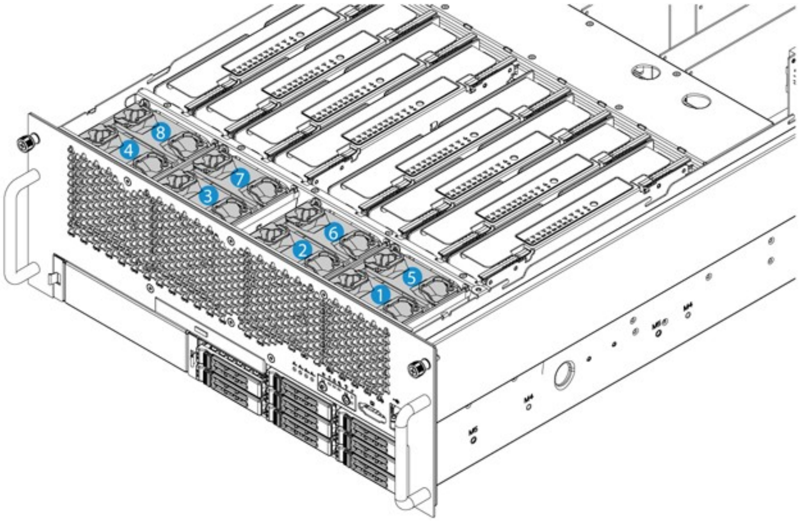


Figure 8. Cooling Fan Locations

Each fan (or pair of redundant fans in series) provides cooling for a zone of the mainboard that includes two memory riser slots and one CPU socket. Dividers separate the memory risers to allow for proper airflow for each riser. The zones are designed to be redundant in order to maintain system cooling in the event of fan failure. To maintain system performance, only one of the eight fans can fail at any one time. See the following figure for a description of the cooling zones.

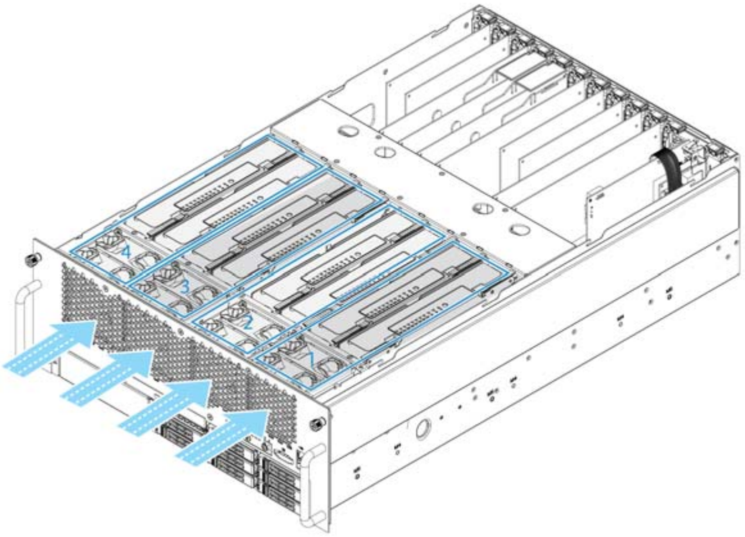


Figure 9. Cooling Zone Configuration

Caution *Wherever a memory riser is not present, a memory air baffle must be installed over the adjacent opening in the fan cage. The memory air baffle restricts airflow to the area where no memory riser is present, ensuring proper airflow over installed DIMMS. Memory air baffles are needed for all parts of the mainboard where no memory risers are present.*

In addition, there are two dual-motor fans located within each power supply drawing air through the hard drives and across the power distribution board.

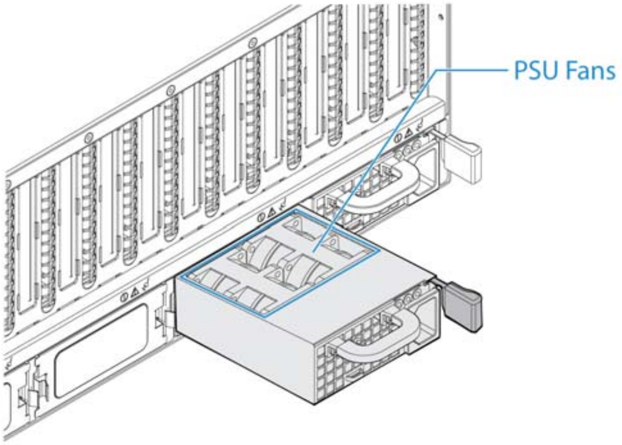


Figure 10. PSU Fan Locations

Note: The cooling system is non redundant in a non-redundant power supply system configuration.

Fan Modules

The QSSC-S4R Server System supports eight hot swap fan modules that are located at the upper front of the chassis and can be removed inside the chassis with the chassis cover removed (See Figure 8). The fans are docked on the front panel fan board (FPFB). Each fan module has an amber LED wired to the front panel fan board. The LED will turn on when the fan is not functioning within specifications. The fan module sends fan signals via a 2x3 connector to the front panel fan board (FPFB).

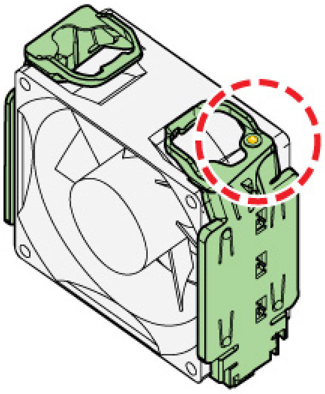


Figure 11. Fan LED Location

Table 13. LED Definition

Fan	LED Color/Behavior	State
Fan#1, 2, 3, 4, 5, 6, 7, 8	Amber – On	Fan Failed
	Off	Fan working correctly

Failed system fans can be hot swapped out of the chassis with the cover removed. The maximum time limit to perform a fan hot swap operation is three minutes before affecting system performance.

Hot Swap PCI Express Slots

The four hot swap PCIe slots have power and attention LEDs. The attention button is used to invoke a hot swap sequence to remove or add an adapter without using the software interface. The green arrow on the PCIe divider label identifies the LEDs.

Table 14. Hot Swap PCIe Slot Power and Attention LEDs

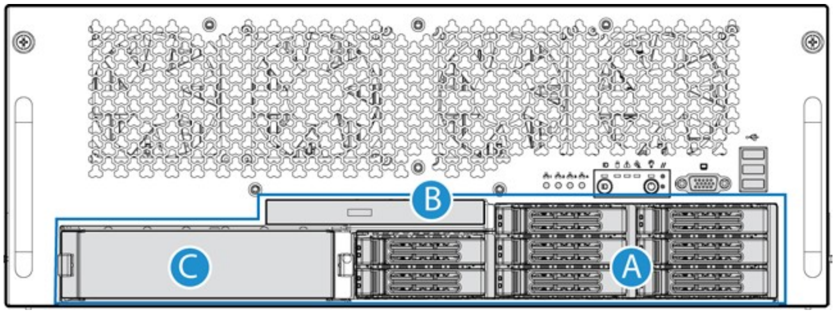
Green Power LED State	Definition
Off	Power off: Power has been removed from the slot. A card can be inserted or removed.
On	Power on: The slot is powered on. A card cannot be inserted or removed.
Blinking	Power transition: The slot is powering up or down. A card cannot be inserted or removed.
Amber Attention LED State	**Definition**
Off	Normal: Normal operation.
On	Attention: Power fault or operational problem has occurred with this slot.
Blinking	Locate: identifying slot.

Peripherals

The following peripheral devices are supported:

- Up to eight hot swap 2.5 inch SAS hard drives or six 2.5 inch SATA hard drivers (See area A in the figure below)
- One slim-line SATA DVD-RW drive (See area B in the figure below)
- One 5.25” device bay (See area C in the figure below)

A hot swap backplane (HSBP) provides power and I/O for the hard disk drives and slimline optical drive. See "Hot Swap Backplane Board" on page 31 for more information on the HSBP. A separate 4-pin 12V molex power connector is provided for powering the 5.25" device. I/O for the 5.25" device can be accomplished via one of the SATA connectors on the mainboard.

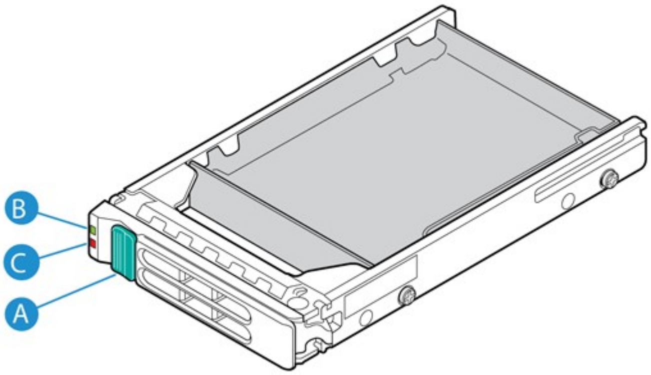


Item	Description
A	Hard disk drives
B	Slim line SATA DVD RW drive
C	5.25" device bay

Figure 12. Peripheral Area

Hot-Swap Hard Drive

The hard drive carrier is an assembly that provides guidance for hot swapping. It contains two integrated light pipes to transfer the LED indicator light driven by the SGPIOs, and an insertion/extraction mechanism that includes a hard drive bezel.



Item	Feature	LED State	Description
A.	Latch		
B	LED	Green Blinking	HDD access or spin up/down
C	LED	Amber – On	HDD fault
		Amber – Blinking	Predictive failure, rebuild, identify
		Off	No access and no fault

Figure 13. Hard Drive Carrier

Note: For a full description of LED behavior and differences between SAS and SATA drives refer to Table 17 on page 32.

Optical Drive Bay

This is supported in the Enterprise SKU with SATA cabling installed. For the Value SKU, users will need to sacrifice one SATA port on the main board to use the optical drive bay.

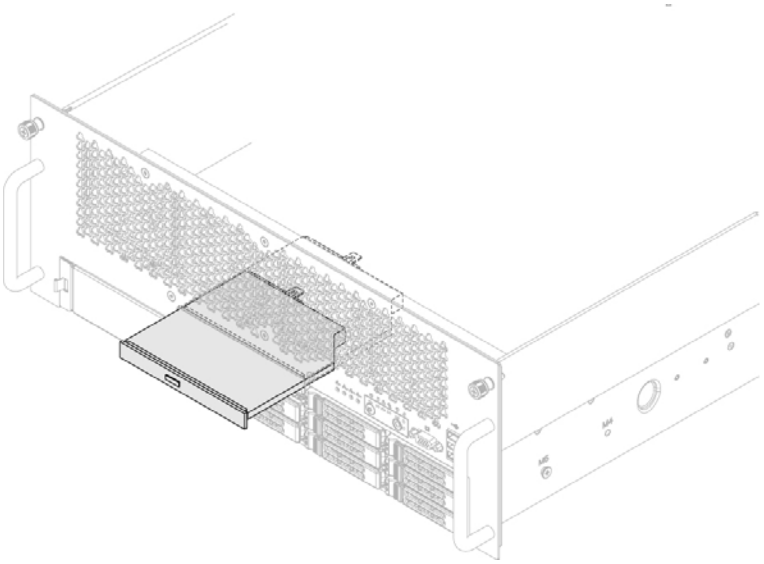


Figure 14. Optical Drive

5 ¼-inch Half-height Drive Bay

The system includes a bay that can support a half height 5.25” tape device. The system includes a 5.25” device blank for the 5.25” device opening. It matches the shape and interface of a 5.25” device. The blank includes the 5.25” device rails such that field upgrade to 5.25” device is possible. This is supported in the Enterprise SKU. For the Value SKU users will need to sacrifice one SATA port on the main board to utilize the 5.25” drive bay.

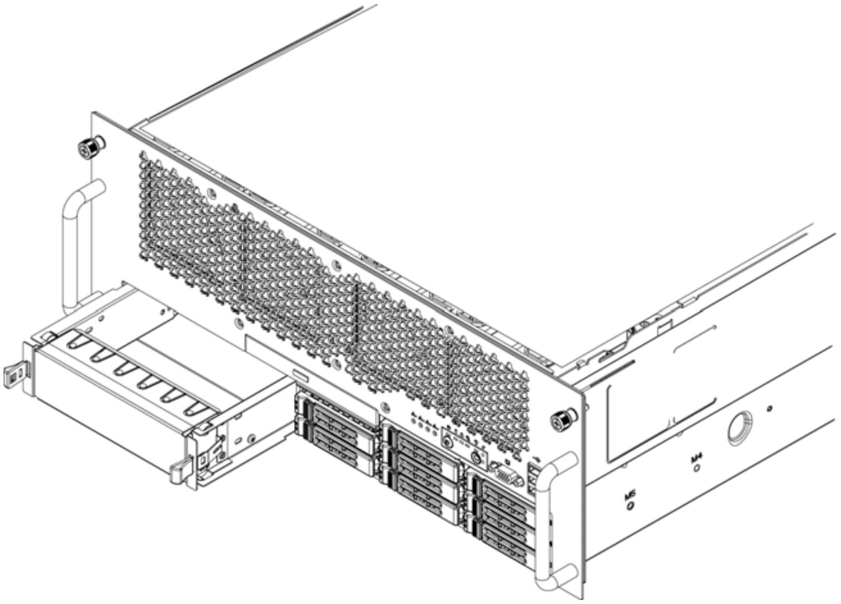


Figure 15. 5 1/4-inch half-height drive

System Boards

The board set consists of the following:

- Main board
- Memory riser
- I/O riser
- Hot Swap Backplane (HSBP)
- Front Panel Fan Board (FPFB)
- Power Distribution Board (PDB)
- Operator Panel (OP Panel) Board
- SAS Riser: 6 Gb SAS RAID riser card. Refer to QSSC-*S4R Configuration Guide*)
- Intel® Remote Management Module 3 (RMM3).

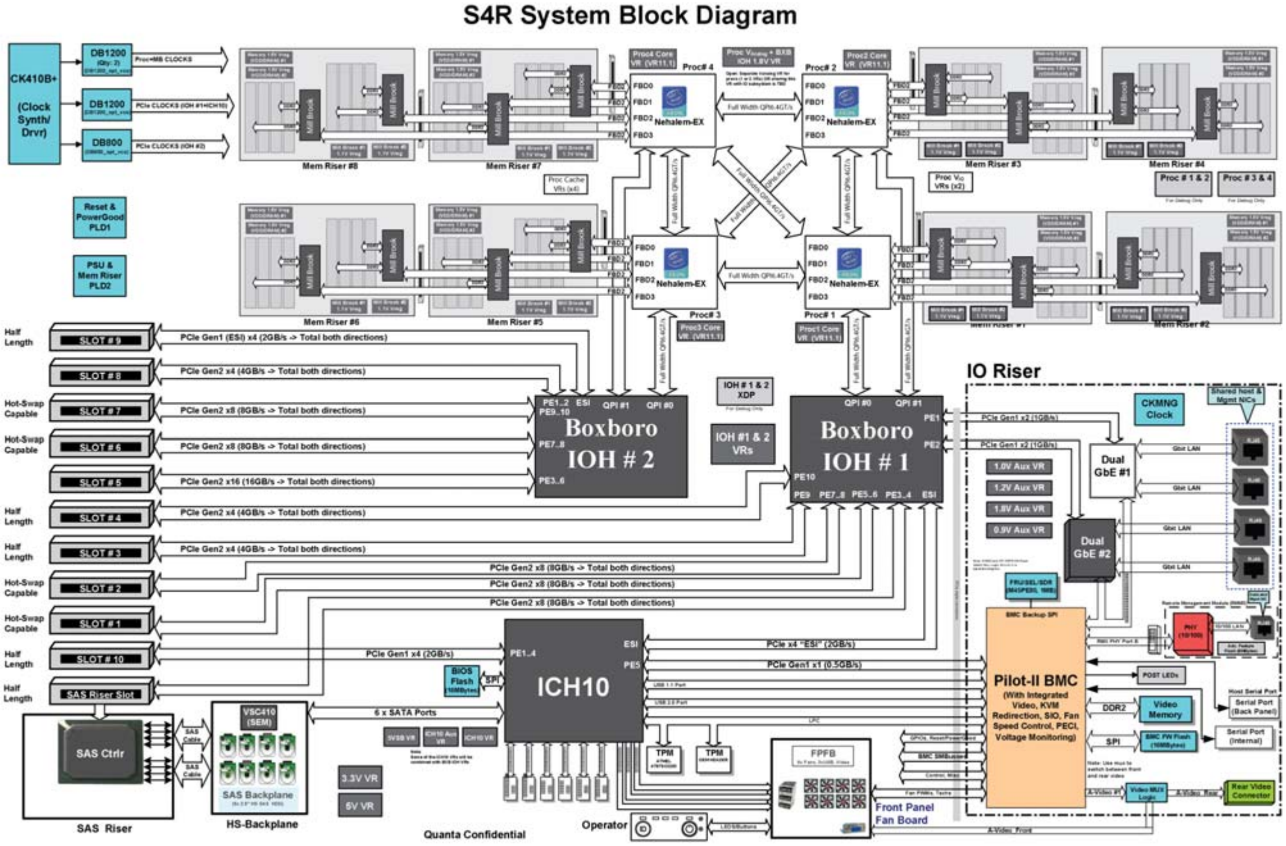

S4R System Block Diagram
CK410B+ (Clock Synth/ Drvr)
DB1200 (Qty: 2)
Proc+MB CLOCKS
DB1200
PCIe CLOCKS (IOH #1+ICH10)
DB800
PCIe CLOCKS (IOH #2)
Reset & PowerGood PLD1
PSU & Mem Riser PLD2
Mill Brook
Mem Riser #8
Mem Riser #7
Mem Riser #6
Mem Riser #5
Mem Riser #3
Mem Riser #4
Mem Riser #1
Mem Riser #2
Proc Cache VRs (x4)
Proc4 Core VR (VR11.1)
Proc# 4
Proc# 2
Proc2 Core VR (VR11.1)
Proc# 3
Proc3 Core VR (VR11.1)
Proc# 1
Proc1 Core VR (VR11.1)
Proc V_{io} VRs (x2)
Proc # 1 & 2
Proc # 3 & 4
FBD0
FBD1
FBD2
FBD3
Nehalem-EX
Full Width QPI6.4GT/s
Half Length
Hot-Swap Capable
SLOT # 9
SLOT # 8
SLOT # 7
SLOT # 6
SLOT # 5
SLOT # 4
SLOT # 3
SLOT # 2
SLOT # 1
SLOT # 10
SAS Riser Slot
PCIe Gen1 (ESI) x4 (2GB/s -> Total both directions)
PCIe Gen2 x4 (4GB/s -> Total both directions)
PCIe Gen2 x8 (8GB/s -> Total both directions)
PCIe Gen2 x16 (16GB/s -> Total both directions)
PCIe Gen1 x4 (2GB/s)
PE1..2 PE9..10
ESI
QPI #1
QPI #0
PE7..8
PE3..6
Boxboro IOH # 2
IOH # 1 & 2 XDP
For Debug Only
IOH #1 & 2 VRs
Boxboro IOH # 1
PE1
PE2
PE10
PE9
PE7..8
PE5..6
PE3..4
IO Riser
PCIe Gen1 x2 (1GB/s)
CKMNG Clock
Shared host & Mgmt NICs
Dual GbE #1
Dual GbE #2
Gbit LAN
RJ45
1.0V Aux VR
1.2V Aux VR
1.8V Aux VR
0.9V Aux VR
FRU/SEL/SDR
BMC Backup SPI
PHY (10/100)
RMII PHY Port B
POST LEDs
Pilot-II BMC (With Integrated Video, KVM Redirection, SIO, Fan Speed Control, PECI, Voltage Monitoring)
DDR2
Video Memory
SPI
BMC FW Flash (16MBytes)
Host Serial Port
Serial Port (Back Panel)
Serial Port (Internal)
Note: Use mux to switch between front and rear video
A-Video #1
Video MUX Logic
A-Video Rear
Rear Video Connector
A-Video Front
PCIe x4 "ESI" (2GB/s)
PCIe Gen1 x1 (0.5GB/s)
USB 1.1 Port
USB 2.0 Port
LPC
GPIOs, Reset/PowerGood
BMC SMBuses
Control, Misc
Fan PWMs, Tachs
ESI
PE5
PE1..4
ICH10
BIOS Flash (16MBytes)
SPI
6 x SATA Ports
5VSB VR
ICH10 Aux VR
ICH10 VR
TPM
FPFB
Front Panel Fan Board
Operator
LEDs/Buttons
SAS Ctrlr
SAS Cable
SAS Riser
VSC410 (SEM)
SAS Backplane
HS-Backplane
3.3V VR
5V VR
Quanta Confidential

Figure 16. Block Diagram

Main Board

A fully loaded QSSC-S4R Server System Main Board can support four CPU/heat-sinks, eight memory riser modules, ten PCIe cards, one I/O riser and one SAS riser. The Main Board interconnects with other boards or modules that are plugged directly into the main board or connected via cables. Figure 17 shows main board components. The main board has the following features:

- Board size: 16.3” x 18.65”
- Chipset Boxboro-EX IOH and ICH10R components
- CPU sockets
- Trusted Platform Module
- SPI BIOS Flash components
- Ten PCI-Express* slots
- I/O Riser connector
- SAS Riser connector
- Eight memory riser connectors

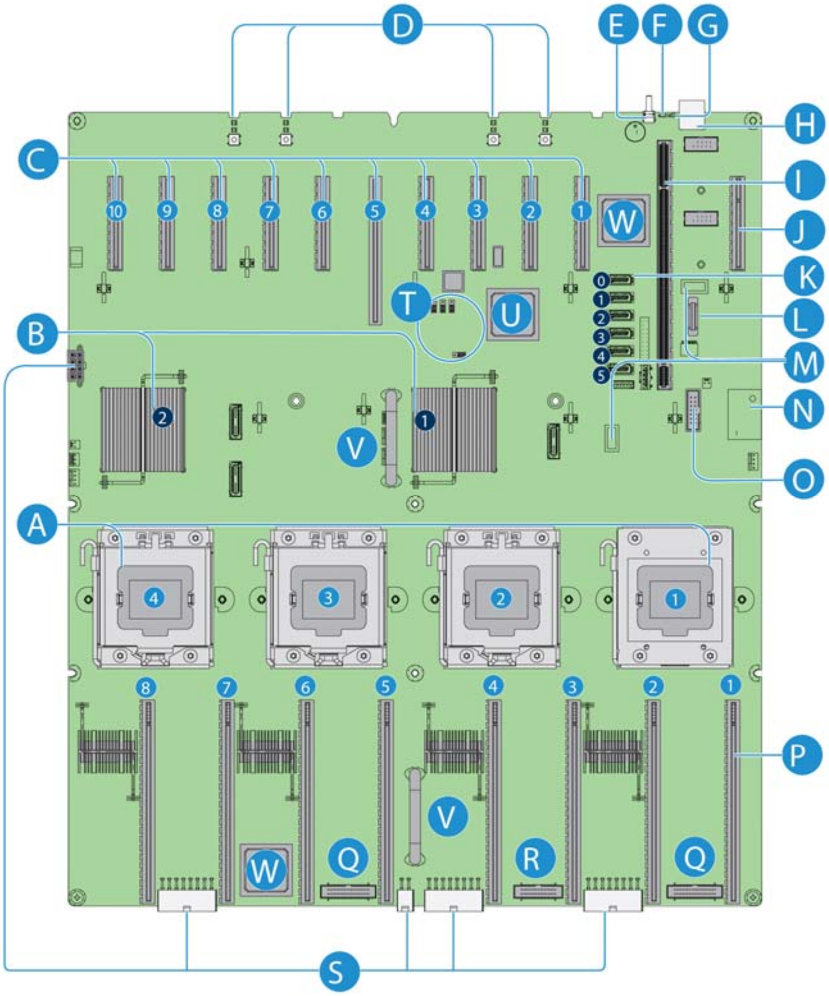


Figure 17. Main Board Component Locations

Table 15. Mainboard components

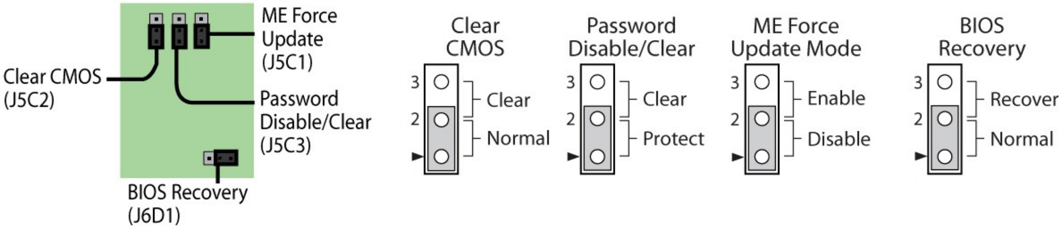
<table>
<tr><th>Item</th><th>Component Type</th><th>#</th><th colspan="2">Description</th></tr>
<tr><td>A</td><td>CPU/socket</td><td>1 – 4</td><td colspan="2">130W Nehalem-EX/Next Gen X processors using Socket-LS (LGA 1567).</td></tr>
<tr><td>B</td><td>IOH/heatsink</td><td>1 – 2</td><td colspan="2">Boxboro-EX IOH</td></tr>
<tr><td rowspan="7">C</td><td rowspan="7">PCIe Expansion Slots</td><td>1 – 2</td><td colspan="2">PCIe Gen2x8, ¾ length, hot swap capable, x8 connector</td></tr>
<tr><td>3 – 4</td><td colspan="2">PCIe Gen2x4, ½ length, non hot swap, x8 connector</td></tr>
<tr><td>5</td><td colspan="2">PCIe Gen2x16, ¾ length, non hot swap, x16 connector</td></tr>
<tr><td>6 – 7</td><td colspan="2">PCIe Gen2x8, ¾ length, hot swap capable, x8 connector</td></tr>
<tr><td>8</td><td colspan="2">PCIe Gen2x4, ¾ length, non hot swap, x8 connector</td></tr>
<tr><td>9 – 10</td><td colspan="2">PCIe Gen1x4, ½ length, non hot swap, x8 connector</td></tr>
<tr><td colspan="3">*Note: A second processor must be installed in CPU socket 3 to support PCIe slots 5-9
*Note: Legacy I/O devices i.e. video cards are only supported on slot #1, 2, 3, 4 or 10</td></tr>
<tr><td rowspan="6">D</td><td colspan="4">Hot swap PCIe LED indicators and buttons</td></tr>
<tr><td colspan="4">Attention button</td></tr>
<tr><td></td><td>LED Color/Behavior</td><td colspan="2">State</td></tr>
<tr><td>Attention LED</td><td>Amber – Blinking</td><td colspan="2">Toggled by pressing the “Attention” button – ready for hot-swap operation.</td></tr>
<tr><td rowspan="2">Power LED</td><td>Green – Solid</td><td colspan="2">Power on.</td></tr>
<tr><td>Off</td><td colspan="2">Power off.</td></tr>
<tr><td>E</td><td>System ID Button</td><td colspan="3">Pressing this button turns the System ID LEDs on Solid. Pressing a button again turns them off.</td></tr>
<tr><td rowspan="5">F</td><td rowspan="5">System ID LED</td><td colspan="3">Provides a visual indicator that the system is being serviced.</td></tr>
<tr><td>Color/LED Behavior</td><td colspan="2">Description</td></tr>
<tr><td>Off</td><td colspan="2">System ID inactive.</td></tr>
<tr><td>Blue – On</td><td colspan="2">System ID active via button</td></tr>
<tr><td>Blue - Blinking</td><td colspan="2">System ID active via remote command</td></tr>
<tr><td rowspan="6">G</td><td rowspan="6">System Status/Fault LED (green/amber)</td><td colspan="3">Indicates system status</td></tr>
<tr><td>Color/LED Behavior</td><td>State</td><td>Description</td></tr>
<tr><td>Off</td><td>Not ready</td><td>AC power off, POST error</td></tr>
<tr><td>Green – On</td><td>Ready</td><td>System booted and ready</td></tr>
<tr><td>Green – Blinking</td><td>Non-critical Alarm</td><td>• Non-critical temperature threshold asserted.
• Non-critical voltage threshold asserted.
• Non-critical fan threshold asserted.
• Fan redundancy lost, sufficient system cooling maintained. (This does not apply to non-redundant systems.)
• Power supply predictive failure.
• Power supply redundancy lost. (This does not apply to non-redundant systems.)</td></tr>
<tr><td>Amber – Blinking</td><td>Non-Fatal Alarm</td><td>• CATERR asserted.
• Critical temperature threshold asserted.
• Critical voltage threshold asserted.
• Critical fan threshold asserted.
• VRD hot asserted.
• SMI Timeout asserted.</td></tr>
</table>

		Amber – On	Critical alarm	• CPU Missing. • Thermtrip asserted. • Non-recoverable temperature threshold asserted. • Non-recoverable voltage threshold asserted.
H	External USB	Rear: 2x4-pin double stacked USB2.0 connector		
I	IO Riser Slot	Designated slot for the IO Riser		
J	SAS Riser Slot	PCIe Gen2x8, ½ length, non hot swap, x8 connector – designated for SAS RAID HBA in Enterprise SKU		
K	Onboard SATA	6 29-pin SATA/SAS Drive Connectors, supporting SATA 2.5" hot swappable hard disk drives (HDDs)		
L	Main Board Battery	3-volt lithium battery to provide power to the RTC when the Main Board is powered down.		
M	Internal USB header x2	Support two internal USB2.0 Solid State Drive flash storage devices docking to Main Board		
N	Peripherals	TPM Header		
O	Front panel USB connector	Connector for front panel USB ports		
P	Memory Riser Slots	1 – 8 Up to eight hot swap memory modules each with up to eight DDR3 RDIMMs		
Q	FPFB Signal Connectors	Signal connectors (x2) to the front panel fan board		
R	PDB Signal Connector	Signal connector to the power distribution board.		
S	PDB Power Connectors	Power connectors		
T	BIOS Jumpers	See Figure 18. Main Board Jumper .		
U	ICH 10R	I/O Controller Hub		
V	Main Board Handle x2	Two handles on the main board for easier Installation and un-installation from the chassis		
W	CPLD Chips	Complex programmable logic device X 2		

Table 16. Details of PCIe Expansion Slots

Slot ID	Length	Height	HotSwap	Conn	Lanes	Tech	Source	Legacy support?*	Port
SAS Riser	½	Full		x8	x8	Gen 2	IOH #1	N	PE3..4
Slot 1	¾	Full	√	x8	x8	Gen 2	IOH #1	Y	PE5..6
Slot 2	¾	Full	√	x8	x8	Gen 2	IOH #1	Y	PE7..8
Slot 3	½	Full		x8	x4	Gen 2	IOH #1	Y	PE9
Slot 4	½	Full		x8	x4	Gen 2	IOH #1	Y	PE10
Slot 5	¾	Full		x16	x16	Gen 2	IOH #2	N	PE3..6
Slot 6	¾	Full	√	x8	x8	Gen 2	IOH #2	N	PE7..8
Slot 7	¾	Full	√	x8	x8	Gen 2	IOH #2	N	PE9..10
Slot 8	¾	Full		x8	x4	Gen 2	IOH #2	N	PE1..2
Slot 9	½	Full		x8	x4	Gen 1	IOH #2	N	ESI
Slot 10	½	Full		x8	x4	Gen 1	ICH10	Y	PE1..4

Legacy support includes any boards that are not fully plug-and-play compliant, for instance, video boards that use a BIOS extension (or Option ROM). Boards that by default support legacy platforms that attempt to perform direct hardware access should only be installed in the PCIe slots that provide legacy support.



Jumper Name	Location	Default	Stuffed Jumper State
Password disable/clear	J5C3	Stuff	1 - 2 = Password protect
		Empty	2 - 3 = Password disabled / cleared
Clear CMOS	J5C2	Stuff	1 - 2 = Normal
		Empty	2 - 3 = Forced CMOS clear
Management Engine (ME) force update	J5C1	Stuff	1 - 2 = Disable ME force update
		Empty	2 - 3 = Enable ME force update
BIOS Recovery	J6D1	Stuff	1 - 2 = Disable BIOS Recovery
		Empty	2 - 3 = Enable BIOS Recovery

Figure 18. Main Board Jumper Settings

SATA Device Support

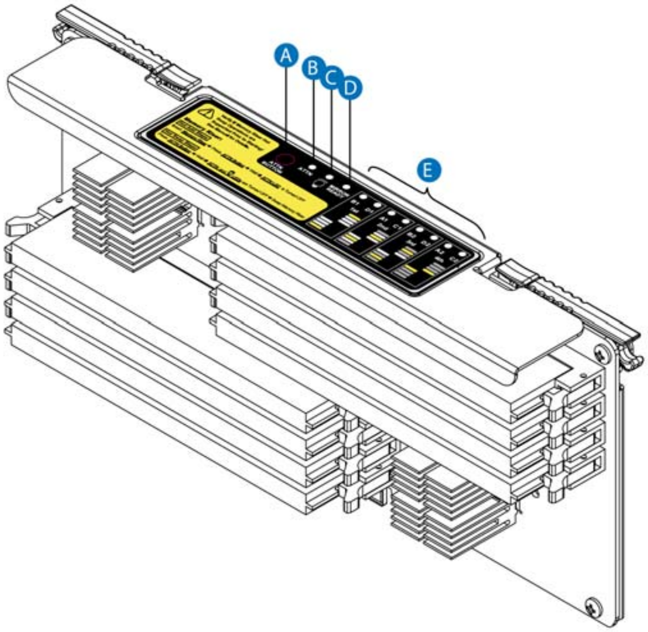
SATA device support is provided via six SATA connectors located on the Mainboard. These connectors are wired directly to the hot swap backplane in the Value SKU; SATA 0 is connected to the slimline optical drive in the Enterprise SKU.

Memory Riser

The QSSC-S4R Server System supports up to eight memory riser modules that plug into the main board vertically via PCIe X24 card edge connectors. Each memory riser has the following features:

- Support for up to eight DDR3 registered DIMMs
- Two Intel® 7500 Scalable Memory Buffers, each supporting two DDR3 buses; each DDR3 bus supporting two DDR3 DIMMs
- The Intel® 7500 Scalable Memory Buffer supports the following features:
  - Intel® SMI (Intel Scalable Memory Interconnect) protocol and signaling
  - 4.8 Gbs, 6.4 Gbs signaling forwarded clock fail-over NB and SB
  - Support for integrating RDIMM thermal sensor information into Intel SMI status Frame
  - No support for FB-DIMM1 protocol and signaling
- Hot swappable at the memory riser level but not supported on individual DIMM level for hot swap
- Supports DDR3-1066 RDIMMs at speeds of 800, 978 and 1066MHz.
- Supports DDR3-1333 RDIMMs running at 1066, 978 and 800MHz.
- All channels in a system will run at the fastest common frequency
- Supports DDR3 registered DIMM configurations of up to x8 dual-rank (DR) and x4 quad-rank (QR) DDR3 SDRAM
- Supports DDR3 DRAM technologies of 1Gbit and 2Gbit
- Supports 1GB, 2GB, 4GB, 8GB & 16GB (16GB with QRx4 DIMMs only) DIMM capacity. 16 GB QR DIMMs can only occupy half of the available slots in a memory riser; otherwise the system may exceed thermal specifications.
- Mixed memory DIMM is not supported. Mixed DIMM includes a mix of RDIMM and UDIMM, mixed DIMM sizes and mixed DIMM technologies.
- Cmd/Addr parity generation and error logging.
- Supports CLTT (Closed Loop Thermal Throttling) via temperature sensors on registered DIMMs.

- Supports DDR3 JEDEC standard temperature sensors on all DIMMs.
- LED fault indicators for each DIMM.
- On board voltage regulators for 0.75V, 1.1V, 1.5V and 1.8V.
- One Field Replaceable Unit (FRU).
- Supports memory RAS features including Lock Step mode, Interleaving, Mirroring Mode, Sparing Mode and Hemisphere Mode.



Item	Description
A	Attention Button
B	Attention LED
C	Power LED
D	Mirror Ready LED
E	DIMM Fault LEDs 1-8

Figure 19. Memory riser LEDs and connectors

Item			LED Color/Behavior	State
DIMM Fault LED	1B	First pair	Amber-On	1B DIMM fault
	1D			1D DIMM fault
	1A	Second pair		1A DIMM fault
	1C			1C DIMM fault
	2B	Third pair		2B DIMM fault
	2D			2D DIMM fault
	2A	Fourth pair		2A DIMM fault
	2C			2C DIMM fault
Mirror Activity LED			Green – On	Mirror activity
Power LED			Green – On	Power is on
			Off	Power is off
Attention LED			Amber – On	Attention button is pressed.

The DIMM slots on the memory riser are divided into upper right and lower left DIMM slot areas, numbered in pairs in the order of 1B + 1D, 2B + 2D, 1A + 1C and 2A + 2C, as shown in Figure 60. See ”Supported Memory Configurations” on page 69 for population rules.

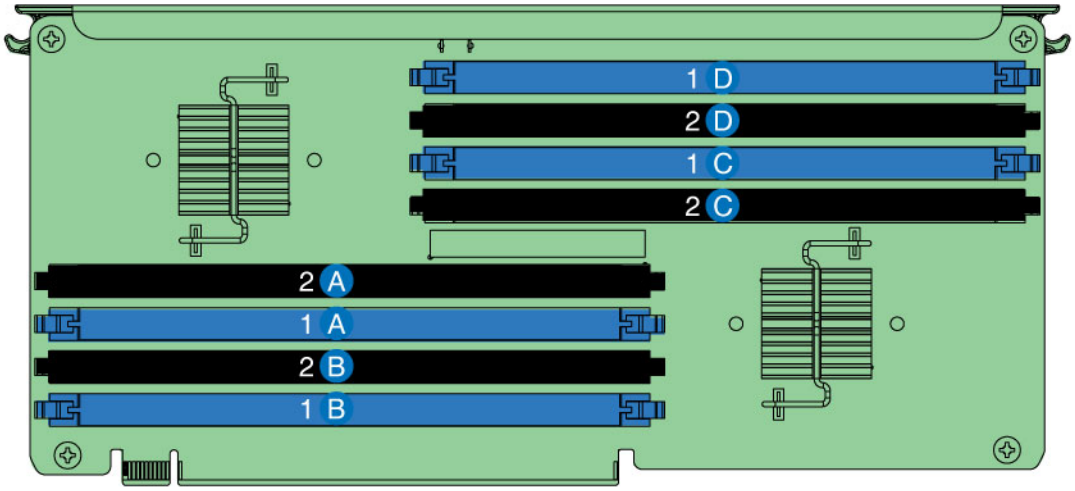


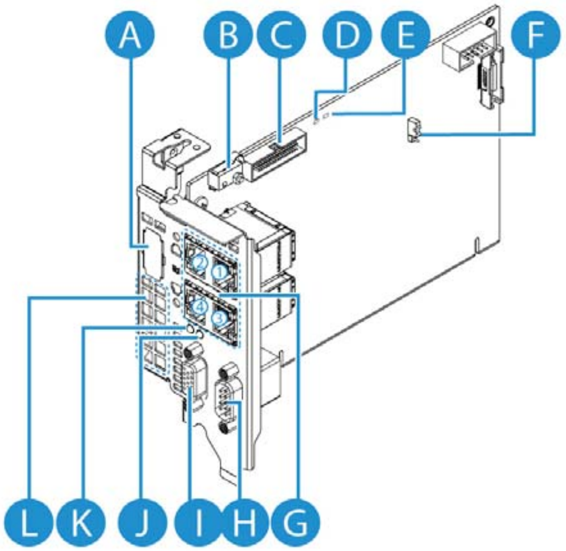
Figure 20. Memory DiMM Locations

I/O Riser

The I/O riser provides most of the systems rear I/O including four GbE LAN ports, serial and video connectors. In addition, the optional advanced server management upgrade kit with mounting and connections supports the Intel® RMM3 LAN management module.

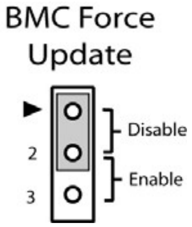
The I/O riser supports the following features:

- Two Intel® 82576 PCIe based Ethernet controllers provides advanced networking control capability.
  - Two PCI Express interface (x2), 2.5 Gbps
  - Two fully integrated GbE Media Access Control (MAC) and physical layer (PHY) ports
  - Support Ethernet interfaces of 10BASE-T, 100BASE-TX and 1000BASE-T
  - Support generation two Intel® I/O Acceleration Technology (Intel® I/OAT 2) capability
  - Support Intel® VT-c, VMDq, PCI-SIG, SR-IOV & IPsec
- Dual gigabit LAN controllers located on the I/O Riser support four Gigabit Ethernet ports
- One serial port
- One VGA (video) port. The rear VGA port supports resolutions as high as 1600x1200
- Integrated Baseboard Management Controller (BMC – Pilot-II): iBMC is a highly integrated single-chip solution, integrating several devices typically found in servers. The following features are integrated into iBMC:
  - Baseboard Management Controller (BMC)
  - Server Class Super I/O (SIO)
  - Graphic Controller
  - Remote keyboard, video, mouse and switch (KVM) features
- Supports advanced server management with the addition of an Intel® Remote Management Module 3 (Intel® RMM 3) installed on a custom I/O riser bracket with dedicated Ethernet maintenance port. The Intel® RMM3 NIC provides an upgrade path to advanced server management capabilities.. Refer to section 2.5.10 for RMM3 module details. When installed with Intel® RMM3, supports advanced remote manageability for KVM (Keyboard, Video & Mouse) redirect, media redirect, USB 2.0 redirect, and can use the IPMB bus interface to remotely shut down the host system via a remote machine.
- Support sensor system management buses for field replaceable unit (FRU)
- Temperature sensor
- Chassis lid open detection switch
- Force BMC update jumper



Item	Description
A	Provision for RMM3 module LAN port.
B	Intrusion detection switch
C	Intel RMM3 Module Connector
D	Heart Beat LED
E	Power LED
F	BMC force updated jumper
G	LAN ports 1-4
H	Serial port
I	VGA port
J	Fan Fault LED
K	CSS LED (Customer Self Service) (Yellow)
L	Post code LEDs

Figure 21. I/O Riser Connectors



Jumper Name	Location	Default	Stuffed Jumper State
BMC force update	J5A1	Stuff	1 - 2 = Disable BMC force update
		Empty	2 - 3 = Enable BMC force update

Figure 22. I/O Board Jumper Settings

SAS Riser

The SAS riser card is installed in the dedicated SAR Riser slot. This card is considered as a required FRU (Field Upgradable Unit) in the Enterprise SKU in order to support the eight 2.5-inch SAS hard drives.

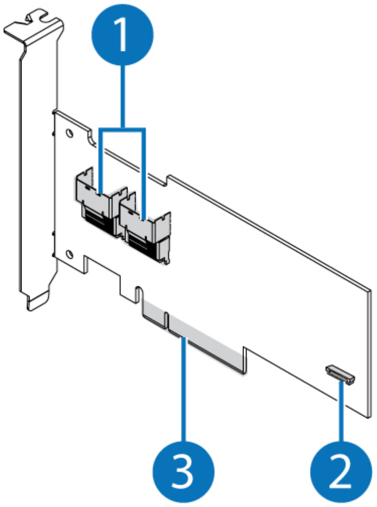
The SAS riser supports the following features:

- SAS RAID Controller, at 800MHz
- PCIe x8 card edge, also compatible with x16 lane slots, 5Gbps or 2.5Gbps serial transfer rate

- Two Internal Mini SAS 4i Connectors
- Eight channels of SAS/SATA at up to 6Gb/s

  SAS rates of 6.0Gb/s and 3.0Gb/s

  SATA rates of 3.0Gb/s and 1.5Gb/s
- Hardware RAID (levels 0, 1, 5, 6, 10, 50 and 60)
- Supports drive hot-plugging
- 5-Chip DDR2 On-Board memory running at 800 MHz (64-bit w/ ECC) for enhanced hardware RAID performance
- 512MB on-board DDR2-800 cache arranged as 64Mx16 devices (1Gb capacity)
- iBBU support: direct connected iBBU07 RAID Battery Back-up module for DDR2 DIMM refresh support during a power failure
- 8MB CFI Compliant Flash ROM and a 32kB NVSRAM (non-volatile SRAM) for disk and drive setup information storage
- SES (System Enclosure Specification) connectivity through I_2C cable or SGPIO
- UART and JTAG debug ports



Item	Description
1	Mini-SAS connectors
2	IBBU battery module connector
3	PCIe connector

Figure 23. SAS Riser Connectors

Front Panel Fan Board

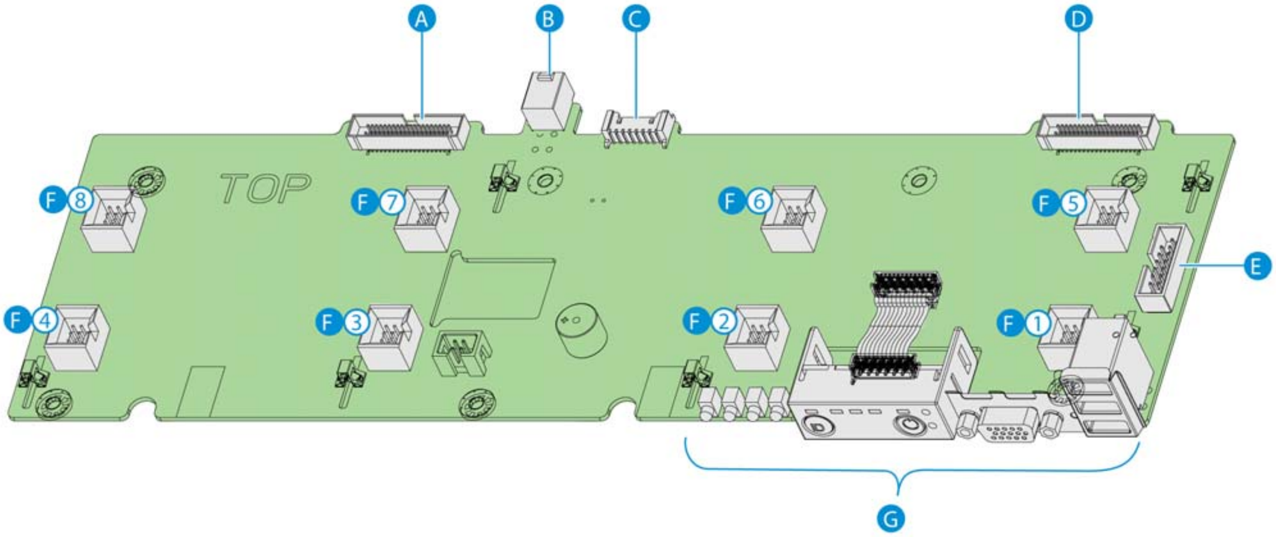
The front panel fan board (FPFB) is designed to function for dual purposes:

- Support the fan subsystem docking the fan modules and providing fan control features;
- Control the front panel I/O providing the end user access to the system video, USB interfaces and LAN port LED indication and controlling the operator panel via a 2x6-pin connector.

The front panel fan board (FPFB) supports the following features:

- Support up to eight 80mm hot swap fans
- Front I/O: one VGA video port and three USB 2.0 external ports
- Cabled Front Panel interface to support the front panel control module

- TMP75 Ambient air sensor
- FRU information EEPROM
- Four individual LAN Act/Link LEDs indicating LAN status of the four LAN ports at the rear, routed from the I/O Riser.
- Thermal sensor
- Hot swap fan noise immunity circuitry
- Easy removable fan bay to access the fan board



Item	Description
A	2X20 Pin Fan Signal
B	2X2 Pin Fan Power
C	1X8 Pin Hot Swap Back Plane Power
D	2X20 Pin Front Panel to Main Board
E	2X7 Pin USB to Main Board
F	Fan Hot Swap Power Connectors 1-8
G	Front Panel LEDs and I/O Ports (see “Figure 4. Operator Panel Controls and Indicators” for details)

Figure 24. Front Panel Fan Board Component Locations

The S4R front panel fan board also provides individual LAN Act/Link LEDs indicating LAN status of the four LAN ports at the rear with signals routed from the I/O Riser. The table below shows the LED functionality.

LED	Color/LED Behavior		State
LAN #1, 2, 3 & 4		Off	Idle
	Green	Blink	LAN access
	Green	On	LAN link/no access

Operator Panel

The operator panel (OP Panel) communicates with the front panel fan board (FPFB) via a cable with a 12-pin connector. It houses the buttons and LEDs described in “Operator Panel / Front Control Panel” on page 5.

The operator panel provides end user access to the system ID, power, re-set and NMI switches. In addition to the features described in **Error! Reference source not found.**, the operator panel also features:

- Tool-less installation/removal of board
- Connection via a 2x6 connector with the front panel fan board

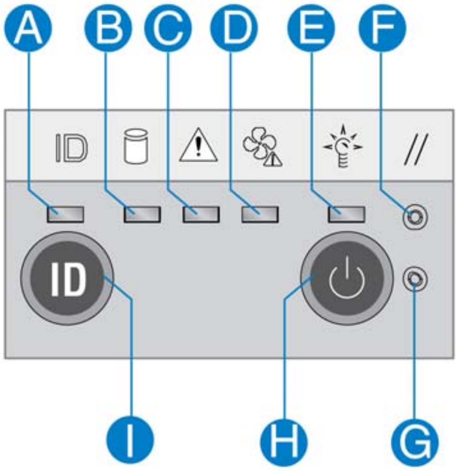


Figure 25. Operator Panel

Item	Feature	Description		
A	System ID LED (blue)	Blue ID that identifies the system through server management or locally		
B	Hard drive status LED (green)	Indicates hard drive activity and fault status		
		Color	**LED Behavior**	**Description**
		Green	Blinking	HDD access or spin up/down
			Off	No access and no fault
C	System status/fault LED (green/amber)	Indicates system status		
		Color/LED Behavior	**State**	**Description**
		Off	Not ready	AC power off, POST error
		Green – On	Ready	System booted and ready
		Green – Blinking	Non-critical Alarm	Redundant PSU or fan failure; Non-critical fan, voltage, and temp. failure.
		Amber – On	Fatal alarm	Non-recoverable temp or voltage threshold; Thermtrip asserted; CPU missing; power control fail; fan or power supply redundancy fail with insufficient cooling or system power.
		Amber – Blinking	Non-fatal Alarm	CATERR asserted; critical temperature, voltage, or fan threshold; VRD hot asserted; SMI Timeout asserted.
D	Fan fault LED (amber)	Amber – Fan fault (on)		
E	System power LED (green)	Indicates system power status		
		Color/LED Behavior	**State**	**ACPI**
		Off	Power Off	No
		Green – On	Power On	No
		Off	S5	Yes
		Green – Blinking	S1	Yes
		Green – On	S0	Yes
F	System reset button	Resets the system		
G	NMI button	Asserts NMI		
H	System power button	Toggles system power		
I	System ID button	Toggles ID LED		

Intel® Remote Management Module 3 (RMM3)

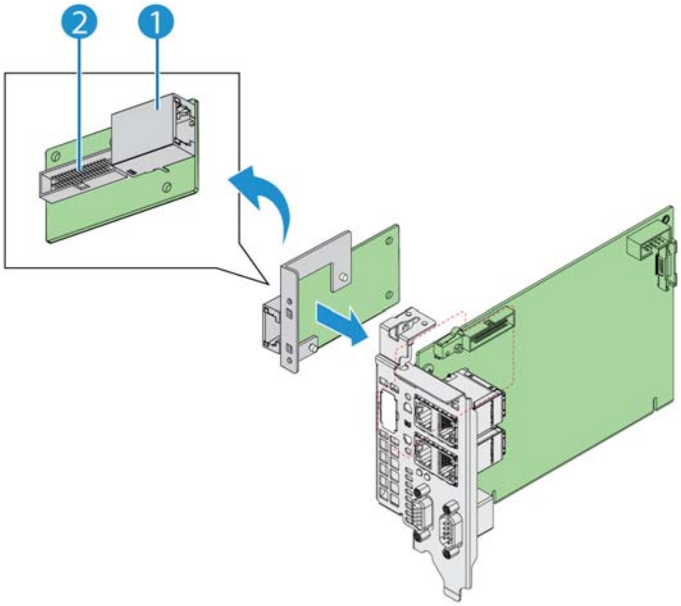
This 1.23" x 2.30" x 0.062" thick printed circuit board is an external Ethernet management board which is designed to work with the BMC (Baseboard Management Controller) enabling remote graphic server control via a built-in Web Console. The optional RMM 3 contains the remote server LAN management support. The module plugs into a connector provided on the I/O riser.

Intel® RMM3 utilizes the on-board ServerEngines* Pilot II Baseboard Management Controller, which is an ARM9 controller with the following features:

- 250 MHz 32-bit ARM9 Processor
- Memory Management Unit (MMU)
- Two 10/100 Ethernet Controllers with NC-SI
- USB 2.0 for Keyboard, Mouse, and Storage devices
- USB 1.1 interface for legacy PS/2 to USB bridging
- Hardware Video Compression for text and graphics
- Hardware encryption
- 2D Graphics Acceleration
- DDR2 graphics memory interface
- Up to 1600x1200 pixel resolution
- PCI Express* x1 support

Advanced server management capabilities enabled when RMM3 is plugged in:

- Embedded Web Console UI supports Remote Power on\off, system health, system info, Event log.
- KVM redirection via either the RMM3 NIC or the baseboard NIC used for management traffic; high performance, up to two simultaneous KVM sessions.
- USB 2.0 (high speed) media redirection – boot over remote media
- Security – open SSL, open LDAP
- IPMI V2.0 Compliance
- KVM - Automatically senses video resolution for best possible screen capture, high performance
- Mouse tracking and synchronization.
- Remote viewing and configuration in pre-boot POST and BIOS setup.



Item	Feature	Description
1	RMM3 LAN Port	RJ45 port for connecting remote management cable
2	Cable connector	Connects to I/O Riser

Figure 26. Intel® Remote Management Module 3

Hot Swap Backplane Board

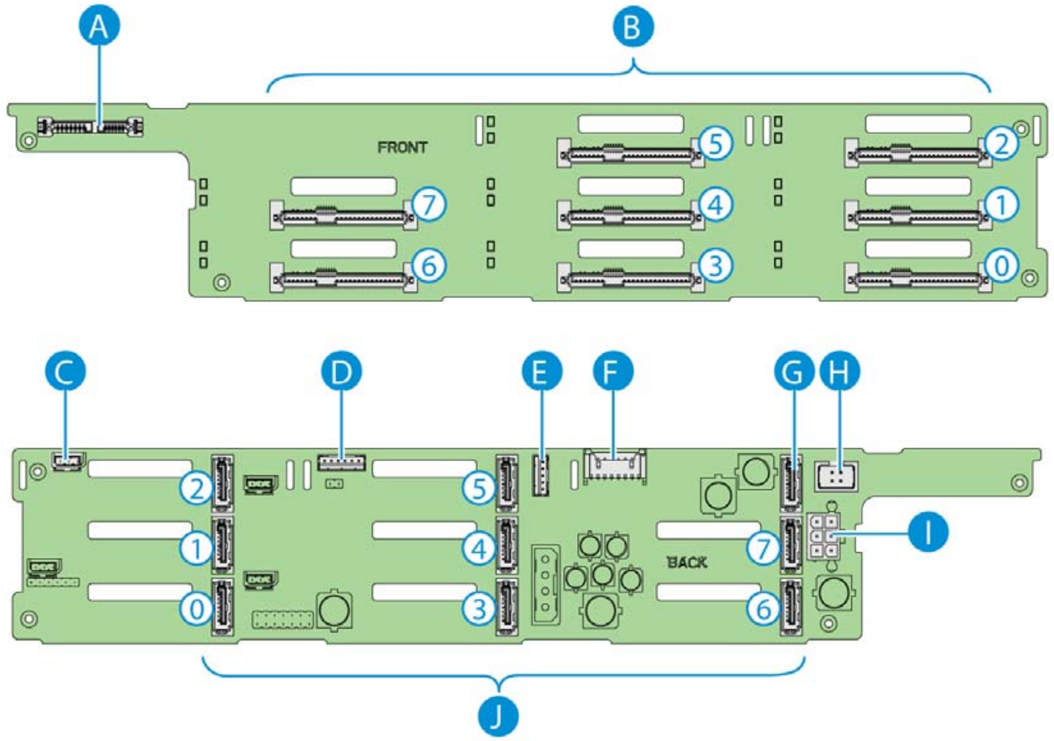
The Hot Swap Backplane (HSBP) supports up to eight 2.5-inch SATA or SAS drives, depending on whether the system has an SAS riser installed.

The board mounts to hooks on the HDD bay and supports the following features:

- Support up to eight 2.5” hot swap SAS/SATA HDD in a horizontal orientation

  Support SAS HDD running at both 3Gb and 6Gb speeds

  Support SATA HDD running at 1.5Gb and 3Gb speeds
- 6Gbit SAS ports provide high-speed serial data paths from the eight attached SAS hard drives to the SAS riser.
- SAS data between drives and riser are routed across two 4-port internal SAS cables that connect the backplane to the PCIe SAS riser, the RAID controller card (HBA). In turn, the SAS RAID HBA is plugged into the baseboard at the PCIe SAS riser slot.
- Eight drives are connected to two x4 SFF-8086* SAS connectors that are used to control SAS traffic flow between drives and the SAS RAID raiser card.
- No mixing of SAS / SATA drives are supported
- No SAS/SATA drive type detection is supported
- Only drive present detect is supported
- SAS enclosure management per SES-2 (System Enclosure Specification) through I2C cable or SGPIO for the SAS RAID riser
- Server management I2C interface
- Support one half-size 5.25” SATA tape device
- Support one SATA slim-line optical disk device (ODD), DVD-RW
- Maxim VSC410 enclosure management microcontroller
- 8MB FW Flash ROM
- 5V regulator to power HDDs, one slim-line optical device, and for a 5.25" tape device. HSBP board does not provide 12V power or data signals for the 5.25" tape device.
- “System board” TMP75 temp sensor dedicated for monitoring 5V regulator.
- Two SAS/SATA SGPIOs
- HSBP control
- Power connector for optical drive and tape drive
- HDD Activity LED
- HDD Fault/Rebuild LED
- I2C Serial EEPROM (FRU)
- Ambient temperature sensor
- Voltage regulators
- 12VDC to 5VDC
- Connectors for main input power



Item	Description
A	13 Pin slimline SATA optical connector
B	29 Pin SAS/SATA Hard Drive Connectors 0-7
C	1X3 Pin SES connector
D	1X6 SATA SGPIO A
E	1X5 SATA SGPIO B
F	1X8 Hot Swap Back Plane Control
G	1X7 SAS/SATA for Optical Drive
H	2X2 Local View / CSS
I	2X3 HSBP Power
J	1X7 SAS SATA connectors for hard drive cables 0-7

Figure 27. Hot Swap Backplane Connectors

HDD LED Indicators	LED Color Behavior	Description
HDD #, 0, 1, 2, 3, 4, 5, 6, 7	Green Blinking	HDD access or spin up/down
	Amber – On	HDD fault
	Amber – Blinking	Predictive failure, rebuild, identify
	Off	No access and no fault

Below is a table showing HDD activity LED differences between SATA and SAS HDDs.

Table 17. 8X HDD Activity LED Functionality on the Hot-Swap Backplane (HSBP)

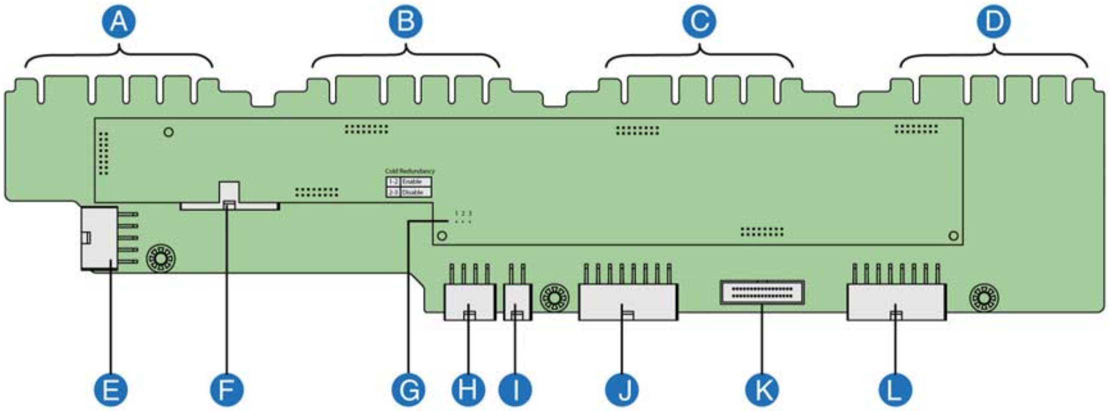
Condition	Drive Type	Behavior
Power on with no drive activity	SAS	Ready LED stays on
	SATA	Ready LED stays off
Power on with drive activity	SAS	Ready LED blinks off when processing a command
	SATA	Ready LED blinks on when processing a command
Power on and drive spun down	SAS	Ready LED stays off
	SATA	Ready LED stays off
Power on and drive spinning up	SAS	Ready LED blinks
	SATA	Ready LED stays off

Power Distribution Board

The power distribution board is located below the main board in the chassis. It has four connectors for hot swap power supply modules. It also contains the control logic supporting the cold redundancy feature, along with 240VA additional protection circuitry for one of the outputs and a FRU EEPROM. It also routes PMBus I²C signals from the power supply modules to the system baseboard and vice versa.

The S4R PDB supports the following features:

- Four power supply card edge gold fingers – the power supply unit (PSU) hot docks to the PDB with mating connectors on the PSU side and gold fingers along the PDB edge
- Cold redundancy functionality.
    - Cold redundancy enabled (default setting): jumper short located on #2 and #3.
    - Cold redundancy disabled: jumper short located on #1 and #2.
- Passes signals to baseboard PLD for power utilization functionality for processor/memory throttling when supporting high power hardware configurations with less than three functional power supplies installed.
- FRU EEPROM
- 240VA limit circuit for 12V power to operator accessible areas on Hot-Swap Backplane (HSBP) and HDDs
- The +12V output power requirements from the power distribution board for one to four 850W power supplies installed and functional. Note: the combined continuous total power limit for all outputs is 2300W maximum
- Utilization logic on the PDB incorporates 4 comparators receiving 4 reference voltages and comparing them with the current share bus signal. The comparators generate four utilization active low logic signals pulled up to the 3.3VSB output. The signals are asserted when power (current) per power supply exceeds 70%, 80%, 90% and 95% of the rated (max current share bus signal) level.



Item	Description
A	Power supply edge connection: PSU#1
B	Power supply edge connection: PSU#2
C	Power supply edge connection: PSU#3
D	Power supply edge connection: PSU#4
E	2X5 Pin PCIe / Chipset
F	2X8 pin BMI Connector
G	Cold Redundancy Jumper
H	2X4 pin HSBP/Fan Power
I	2X2 pin CPU/DIMM power
J	2X8 pin CPU/DIMM power
K	2X17 pin power control land pattern, uses 2X13 connector
L	2X8 pin CPU/DIMM power

Figure 28. Power Distribution Board Connectors

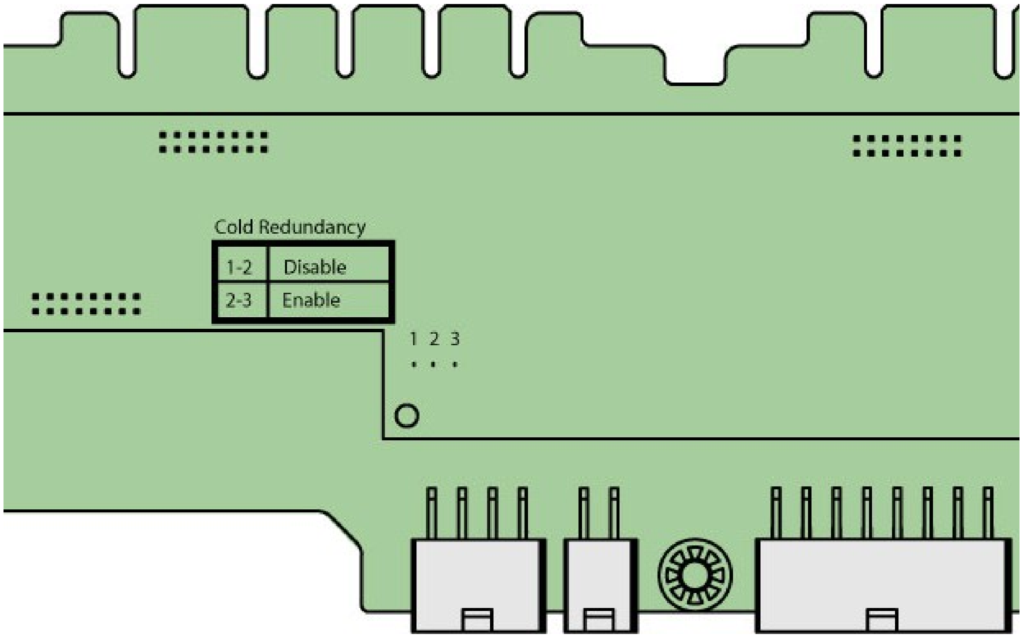


Figure 29. Cold Redundancy Jumper Location

Server and Platform Management

The QSSC-S4R Server System Server Management consists of many embedded technologies. These technologies are a combination of the following:

- Board instrumentation
- Sensors
- Interconnects
- Server management controllers
- Firmware algorithms
- System BIOS

The QSSC-S4R Server System board set platform management system is based on the *IPMI 2.0 Specification.* The system includes the following major elements:

- Baseboard Management Controller (BMC) with RTC access
- IPMI messaging, commands, and abstractions
- Sensors for status, voltage, temperature and fan speed
- Sensor Data Records (SDRs) and SDR repository
- Field Replaceable Unit (FRU) information and System Globally Unique ID (GUID)
- Autonomous event logging
- System Event Log (SEL) [3639 events]
- BMC watchdog timer, covering the BIOS and run-time software
- IPMI channels (LAN1 and LAN3), sessions, and users
- Platform Event Filtering (PEF)
- ICMB (Intelligent Chassis Management Bus) – IPMI messaging between chassis
- IPMI terminal mode support
- BIOS logging of POST progress and POST errors
- SNMP LAN Alerts and email alerting

Chapter 2: Starting Up and Shutting Down the Server

Powering Up the Server

Press the power button on the front control panel. The fans start and POST begins.

> *Note: It might take two minutes or longer for video to be displayed, depending on the amount of memory installed.*

The server attempts to boot from the first device on the list of available devices in the boot manager. If this device is not available, it moves to the second device. It continues down the list until it reaches the first available device.

Shutting Down the Server

1. Exit the operating system if applicable.
2. Press and hold the power button until the server shuts down.

Caution *Powering down the server with the power button does not remove all power. The +3.3V standby power is available even when the system is not running. To remove standby power, unplug all power cords from the system.*

Chapter 3: Server Utilities

Console Management

BMC in the QSSC-S4R server platform

LAN interface

The QSSC-S4R server platform is embedded with the Integrated BMC. The Integrated BMC implements both the IPMI 1.5 and IPMI 2.0 messaging models. These provide out-of-band local area network (LAN) communication between BMC and the network.

BMC Embedded LAN Channels

BMC hardware includes two dedicated 10/100 network interfaces:

- Interface 1 (LAN1): This interface is available from the on-board NIC ports in a system, which can be shared with the host. Only one NIC may be enabled for management traffic at any time.
- Interface 2 (LAN3): This interface is available from RMM3, which is a dedicated management NIC and not shared with the host.

For these channels, support can be enabled for IPMI-over-LAN and DHCP.

For security reasons, embedded LAN channels have the following default settings:

- IP Address: Static
- All users disabled

IPMI-enabled network interfaces may not be placed on the same subnet. This includes the RMM3's on-board network interface, and the BMC's embedded network interfaces.

Host-BMC communication over the same physical LAN connection, also known as "loopback", is not supported. This includes "ping" operations.

IPMI 2.0 Channel Management

Every messaging interface is assigned an IPMI channel ID by IPMI 2.0. Commands are provided to configure each channel for privilege levels and access modes. The following table shows the standard channel assignments.

Table 18. IPMI Channel ID Assignments

Channel ID	Interface	Supports Sessions
	QSSC-S4R server platform	
0	Primary IPMB	No
1	LAN 1(only accessible via NIC_1)	Yes
2	Reserved (To be used on future products to support 2 LAN channels on the baseboard)	–
3	LAN 3 (Provided by the RMM3 card)	Yes
4	Serial (COM2 terminal mode only)	Yes
5	USB	No
6	Secondary IPMB	No
7	SMM	No
8 – 0Dh	Reserved	–
0Eh	Self	–
0Fh	SMS / Receive Message Queue	No

BMC IP Address and external connection

The BMC IP address for a particular embedded NIC is always different from the IP address of the Server's operating system.

The BMC supports static and DHCP sourced IP address assignment on all of its management NICs. The IP address source parameter must be set to "static" before the IP address, subnet mask, or gateway address can be manually set.

If the BMC's IP address on a LAN channel changes while a LAN session is in progress over that channel, the BMC does not take action to close the session except through a normal session timeout. The remote client must re-sync with the new IP address.

Secure Shell (SSH)

Secure Shell (SSH) connections, when RMM3 is present, are supported for SMASH-CLP sessions to the BMC.

BMC Users

The BMC supports the IPMI 2.0 user model including support for User ID 1. 15 user IDs are supported. These 15 users can be assigned to any channel. The following restrictions are placed on user-related operations:

- User names for User IDs 1 and 2 cannot be changed. These will always be "" (Null) and "root" respectively.
- User 2 ("root") will always have the administrator privilege level.
- All user passwords (including passwords for 1 and 2) may be modified.
- User IDs 3-15 may be used freely, with the condition that user names are unique. Therefore, no other users can be named as "" (Null), "root," or any other existing user name.

Table 19. Feature Comparison

Users	User Name	Password	Status	Characteristics
User 1	Null	Null	Disabled	Only Password can be changed.
User 2	root	superuser	Disabled	Only Password can be changed.
User 3	test1	superuser	Disabled	Both user name and password can be changed.
User 4	test2	superuser	Disabled	Both user name and password can be changed.
User 5	test3	superuser	Disabled	Both user name and password can be changed.
User 6-15	undefined	undefined	Disabled	Both user name and password can be changed.

Changing the password is recommended if using user 1 or 2, and changing both user name and password if using user 3-5.

Session Support

Maximum/Minimum session support varies by interface type:

- IPMI Over LAN – Minimum of four sessions
- Embedded WebServer (when advanced features are enabled) – Minimum of four sessions
- Media Redirection – Minimum of two sessions
- KVM – Minimum of two sessions
- Serial Channel – One session only

Remote Management Module 3 (RMM3)

The RMM3 provides the integrated BMC with an additional dedicated network interface. The dedicated interface consumes its own LAN channel. The RMM3 supports advanced features such as KVM redirection and Media redirection.

The web server is available on all enabled LAN channels. If a LAN channel is enabled, properly configured, and accessible, the web server is available.

For security reasons, the null user (user 1) may not be used to access the web server. The session inactivity timeout for the embedded web server is 30 minutes. This is not user-configurable.

Basically, you can easily configure the RMM3 for remote access using SYSCFG:

- Set user's password (other than anonymous users)
- Enable that user on BMC LAN Channel 3 (for RMM3)
- Configure BMC LAN Channel 3's IP address (DHCP or static IP)

For detailed information on how to configure and use RMM3, refer to the *Remote Management Module 3 User Guide.*

Access BMC via RMM3

The RMM3 is IPMI V2.0 Compliant. It allows the customer to remote access BMC through RMM3's dedicated LAN channel (LAN channel 3).

- The customer can send IPMI commands through the dedicated NIC on the RMM3.
- RMM3 also supports SOL over this channel. The customer can activate SOL session via the dedicated NIC on the RMM3.

In order to access BMC via RMM3, you must configure RMM3's IP address and associate BMC user ID to BMC LAN channel 3.

BMC Firmware Update Procedure

BMC firmware can be updated from pre-OS and OS present environments, such as Extensible Firmware Interface, Microsoft Windows* Pre-installation Environment (WinPE), Microsoft Windows* Server and Red Hat* or SuSE* Linux Enterprise Server operating systems.

You can download the server firmware update package from <www.qsscit.com>

Update BMC firmware under EFI

Quanta provides a firmware update package for EFI for each platform on the support web site. In order to download the update and run it under EFI, a USB key is frequently used. Use the following steps for reference:

- Copy "Firmware update package for EFI" (name may vary depending on the platform) to the USB Key and insert USB key to the system.
- Boot system to EFI.
- Change from EFI shell to USB key (for example, fs0:).
- Change directory to the folder where the BMC update package is located.
- Run "updBMC.nsh" to perform the BMC update.
- After update is completed, reboot the system.
- Verify that the BMC firmware has been successfully updated by viewing "System Management Page" in the BIOS menu.

Update BMC firmware under WinPE

Windows Pre-installation Environment (WinPE):

In order to build a customized WinPE CD for factory build purpose, you have to prepare the following content:

- The package "Firmware Update Package for the QSSC-S4R server platform, One-boot Flash Utility, embedded EFI shell, and Microsoft Windows* Pre-installation Execution Environment (WinPE)" (name of the package may vary depending on the platform) is posted for each platform on Quanta's support web site. This download contains BIOS, BMC, FRUSDR, and HSC code for use with the customized WinPE CD.
- Microsoft WinPE CD
- "BIOS, Firmware Update and Configuration utilities for Windows* PE" for each platform on the support web site.

Update BMC firmware using OFU for Windows

Microsoft Windows*:

This method requires the One Boot Flash Update utility (OFU), which needs to be downloaded from Intel's support web site and is part of the "BIOS, Firmware Update and configuration utilities for Windows*":

- Extract the Intel® OFU package for Microsoft Windows* and double-click Setup_Win.exe. It will install the Intel® OFU utility for Microsoft Windows to your system.
- Download and copy "Firmware Update Package for the, One-boot Flash Utility, embedded EFI shell and Microsoft Windows* Preboot Execution Environment (WinPE)" (name may vary depending on the platform) from the support web site to your USB key.
- Run flashupdt –u /updatepackage_location

The new BMC firmware takes effect the next time system is rebooted.

Update BMC firmware using OFU for Linux

Linux*:

Intel provides a solution to allow the customer to update the BMC firmware while Linux OS is running.

This method requires the One Boot Flash Update Utility (OFU), which needs to be downloaded from Intel's support web site and is part of the "BIOS, Firmware Update and configuration utilities for Linux".

- Extract the OFU package for Linux and run ./setup to install the OFU utility on your system.
- Download and copy "Firmware Update Package for the One-boot Flash Utility, embedded EFI shell and Microsoft Windows* Preboot Execution Environment (WinPE)" (name may vary depending on the platform) from the support web site to your USB key.
- Run `flashupdt –u /updatepackage_location`

The new BMC firmware takes effect the next time system is rebooted.

Note: The OFU utility is case sensitive. Therefore, when you transfer the Firmware Update Package using USB key from a Microsoft Windows system to a Linux environment, you must first extract under the Microsoft Windows* environment. Otherwise, you will need to mount the USB key manually with "vfat" option under Linux to avoid conversion from upper case to lower case and vice versa.*

Server Management Software and Utilities

In order to perform in-band and out-of-band management of Servers, several solutions such as tools, utilities, and management software are provided to allow you to manage the system easily.

This chapter provides an overview of Server management utilities, tools, and software.

SYSCFG Utility

The System Configuration Utility (SYSCFG) is a command-line utility that can be used to save and restore BIOS and BMC firmware settings to a file or to set and display individual settings.

SYSCFG is a command-line, scriptable utility. It can be used in a script to automate the process of configuring multiple servers.

The general syntax is: syscfg <switch> <argument1> <argument2> ...

Example: # syscfg /sole 1 enable 1 19200 6 50

For detailed information, refer to the SYSCFG User Guide that is provided with BIOS, Firmware Update, and Configuration Utilities under www.qsscit.com or in the Resource CD that is accompanied with your QSSC-S4R server system.

Supported Operating Systems

SYSCFG can be run from pre-OS boot and post-OS boot environments:

- Extensible Firmware Interface (EFI)

- Microsoft Windows* Installation Environment
- Microsoft Windows*
- Microsoft Windows PE (WinPE)
- Red Hat Enterprise Linus (RHEL)
- SUSE Linux Enterprise Server (SLES)
- UEFI (Unified Extensible Firmware Interface)

Some platforms may not support all the operating environments for this utility. Refer to the SYSCFG User Guide for details.

SYSCFG INI file

The utility supports saving and restoring BIOS and firmware settings both in binary and text mode (from a text file, known as INI file). The advantage of using an INI file is that you can modify and change the values of any of the settings available in the INI file.

To save the BIOS and firmware configuration to an INI file, do the following:

- Boot to one of the supported operating systems on the target system.
- Change directories to the location of the syscfg executable. (This location must be writable to allow you to save the system configuration.)
- In Microsoft Windows*, Windows Pre-installation Environment*, or EFI, type: syscfg /s ini filename.ini
- In Linux*, type: ./syscfg /s ini filename.ini

If you have already saved the configuration to a file, use the following procedure to restore the system to the saved configuration, or set the configuration on identical servers to the saved configuration.

Unlike restoring from a binary file, the advantage of using an INI file is that you can modify and change the values of any of the settings available in the INI file. In this scenario, the INI file does not clone servers but provides a mechanism of configuring the same items with different values per your requirement.

Note: For restoring uneditable fields, section name headers and key names should not be edited or deleted from the INI file.

To restore both BIOS and FW settings defined in an INI file, do the following:

- Boot the system to one of the supported operating systems.
- Change directories to the directory containing the syscfg executable. (The saved configuration file should also be located in this directory.)
  - In Microsoft Windows*, Windows Pre-installation Environment*, or EFI, type: syscfg /r filename.ini /b /f
  - In Linux*, type: ./syscfg /r ini filename.ini /b

SYSCFG installation and usage

- Linux:
  - Download BIOS, Firmware Update, and Configuration Utilities for Linux from <www.qsscit.com> and unzip the "syscfg-linux.zip" file into a folder on your Linux system.
  - Run the 'installme' script to install the 'syscfg' and 'smi' rpms.

The SYSCFG utility is installed in the path /usr/local/syscfg.

- UEFI
  - Set the syscfg path variable SYSCFG_PATH.
    Example: - set SYSCFG_PATH fs0:\<syscfg_efi>
    where syscfg_efi is the folder containing all the files mentioned above.
  - Run 'syscfg' commands from the location where the files are copied.
- Windows
  - Download BIOS, Firmware Update, and Configuration Utilities for Windows from www.qsscit.com

    - For 32-bit platforms, go to the InstallationIA32 folder from the command prompt, and run Install.Cmd.
    - For EM64T platforms, go to the InstallationEM64T folder from the command prompt, and run Install.Cmd.

  The above command will install the respective drivers to be used by the SysCfg utility.

  - From the command prompt, go to SysCfg Release folder and run the desired commands for the utility.

- WinPE

For information about customizing your own WinPE CD image, refer to the white paper available on the support refer to the document available at http://support.intel.com/support/motherboards/server/sb/CS-022714.htm.

SEL Viewer

The QSSC-S4R server platform System Event Log (SEL) Viewer is used to display, clear, or save the SEL on your server.

The Baseboard Management Controller (BMC) records details about the system events in a log in flash memory. Each SEL entry is a single system event.

The SEL Viewer utility provides the ability to view system event records stored on the server management storage device of a server. The utility displays the SEL records in either a text or hexadecimal format. The utility also allows the user to save SEL entries to a file and load SEL entries from a file for viewing. The user can also reload SEL entries from a server and see properties of SEL entries. The SEL entries can be viewed in two modes: interpreted text mode and hex mode.

The SEL Viewer utility runs on the target servers in:

- Extensible Firmware Interface (EFI) shell
- Microsoft Windows Preboot Environment command window
- Microsoft Windows Server 2008* 32/64-bit, Microsoft Windows Server 2003* SP1, and Windows XP* SP2
- Linux*

The SEL Log format

The SEL entry is originally in HEX format. The SEL viewer utility has the ability to translate the SEL records from hexadecimal format to human readable text format.

Example:

HEX format SEL entry:

```
RID:[04][00] RT:[02] TS:[2F][58][71][48] GID:[20][00] ER:[04] ST:[10] SN:[09] EDIR:[6F] ED1: [42] ED2: [0F] ED3: [FF]
```

Corresponding text SEL entry:

```
07/06/2008-23:41:35      Event Log Cleared /System Event Log    The BMC on S5400SF has reported an informational assertion event for System Event Log. The event has the following information: the log area has been reset and/or cleared. There is no recommended action defined for this event.          BMC - LUN #0 (Channel #00h)
```

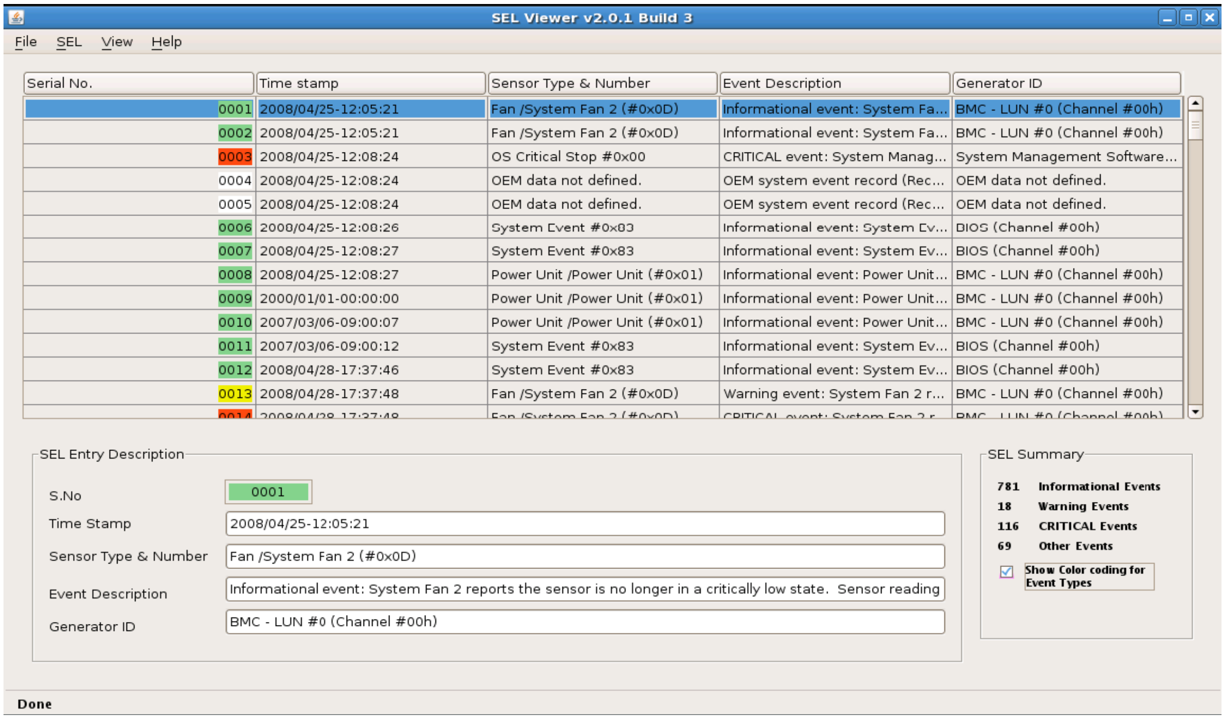
Launching the SEL Viewer

The SEL Viewer utility can be run from the command line or GUI interface depending on the OS that is running:

- Command line:

```
selview [/clear | {/save [filename] [/hex]} | /h | /?]
```

- Launch SEL viewer in GUI interface mode:



Serial No.	Time stamp	Sensor Type & Number	Event Description	Generator ID
0001	2008/04/25-12:05:21	Fan /System Fan 2 (#0x0D)	Informational event: System Fa...	BMC - LUN #0 (Channel #00h)
0002	2008/04/25-12:05:21	Fan /System Fan 2 (#0x0D)	Informational event: System Fa...	BMC - LUN #0 (Channel #00h)
0003	2008/04/25-12:08:24	OS Critical Stop #0x00	CRITICAL event: System Manag...	System Management Software...
0004	2008/04/25-12:08:24	OEM data not defined.	OEM system event record (Rec...	OEM data not defined.
0005	2008/04/25-12:08:24	OEM data not defined.	OEM system event record (Rec...	OEM data not defined.
0006	2008/04/25-12:08:26	System Event #0x83	Informational event: System Ev...	BIOS (Channel #00h)
0007	2008/04/25-12:08:27	System Event #0x83	Informational event: System Ev...	BIOS (Channel #00h)
0008	2008/04/25-12:08:27	Power Unit /Power Unit (#0x01)	Informational event: Power Unit...	BMC - LUN #0 (Channel #00h)
0009	2000/01/01-00:00:00	Power Unit /Power Unit (#0x01)	Informational event: Power Unit...	BMC - LUN #0 (Channel #00h)
0010	2007/03/06-09:00:07	Power Unit /Power Unit (#0x01)	Informational event: Power Unit...	BMC - LUN #0 (Channel #00h)
0011	2007/03/06-09:00:12	System Event #0x83	Informational event: System Ev...	BIOS (Channel #00h)
0012	2008/04/28-17:37:46	System Event #0x83	Informational event: System Ev...	BIOS (Channel #00h)
0013	2008/04/28-17:37:48	Fan /System Fan 2 (#0x0D)	Warning event: System Fan 2 r...	BMC - LUN #0 (Channel #00h)
0014	2008/04/28-17:37:48	Fan /System Fan 2 (#0x0D)	CRITICAL event: System Fan 2 r...	BMC - LUN #0 (Channel #00h)

S.No: 0001
Time Stamp: 2008/04/25-12:05:21
Sensor Type & Number: Fan /System Fan 2 (#0x0D)
Event Description: Informational event: System Fan 2 reports the sensor is no longer in a critically low state. Sensor reading
Generator ID: BMC - LUN #0 (Channel #00h)

781	Informational Events
18	Warning Events
116	CRITICAL Events
69	Other Events

☑ Show Color coding for Event Types

Figure 30. SEL Viewer GUI page for Linux

For detailed information on how to use the SEL viewer, refer to the System Event Log (SEL) Viewer Utility User Guide that is provided with BIOS, Firmware Update, and Configuration Utilities.

System Management Software

QSSC-S4R server platform System Management Software (SMS) offers remote monitoring, configuration, updates, and troubleshooting management features.

Table 20. SMS components

Features	Benefits
Command Line Interface (DPCCLI)	Manage the QSSC-S4R server platform using a command line interface that allows users control regardless of the state of the operating system.
SNMP Subagent	Integrate into an enterprise console that supports SNMP.

Intel Command Line Interface

The QSSC-S4R server platform Command Line Interface console, called dpccli, runs on the management console and enables communication between the management console and the network proxy, which in turn communicates to the managed server.

The QSSC-S4R server platform Command Line Interface uses a network proxy (dpcproxy) that runs on the managing client system or on a central network proxy. The network proxy must be installed prior to using DPCCLI.

DPCCLI Features and Benefits

The Command Line Interface lets you control a server from the command line rather than from a graphical user interface. You can enter Command Line Interface commands at a command prompt or from a script file to do the following:

- Remotely power on or off a server
- Remotely reset the server
- Request machine identifiers
- Read sensor values

- Display the network configuration of the BMC
- IPMI 1.0, 1.5 and 2.0 authentication support
- Packet encryption based on IPMI version

You can use any of the following consoles to launch dpccli or telnet and issue Command Line Interface commands:

- The Window's command-line environment (command prompt)
- A Linux* command shell

Using DPCCLI

The Command Line Interface tool has two modes: Platform Control mode and Serial Over LAN (SOL) Console Redirection mode.

Platform control mode

When the Command Line Interface is in Platform Control mode, you can issue commands to the remote system.

To start a Command Line Interface session with dpccli, the network proxy dpcproxy must be running, either on the managing console or a central network proxy system. However, by default you should not have to do anything for the network proxy to be running, because the installation program installs the network proxy and sets it up for automatic start upon reboot.

Serial Over LAN (SOL) mode

When the Command Line Interface is in SOL Console Redirection mode, you can perform, over a LAN connection, any activity you could at the remote system's console, including viewing the remote system's console output (SOL allows data from the server serial port to be redirected over the LAN).

The Serial over LAN Console Redirection mode of Command Line Interface lets servers transparently redirect the serial character stream from the baseboard UART to and from the managing client system over the LAN. Serial over LAN has the following benefits compared to a serial interface:

- Eliminates the need for a serial concentrator
- Reduces the amount of cabling
- Allows remote management of servers without video, mouse, or keyboard (headless servers)

For a command prompt console, you must start dpccli before you can access the Command Line Interface commands. The dpccli executable file acts as an interface between the console and the network proxy. Once the interface is started, you can then connect to a server and enter commands.

DPCCLI 'vs Telnet

There are two basic ways to issue Command Line Interface commands through the network proxy to a remote server: by using the console interface, called dpccli; or by using telnet.

DPCCLI

An Command Line Interface session over dpccli requires a server name (or address) and login (user and password), which can be supplied as arguments to the dpccli command.

Telnet

When using telnet to connect to the remote server (to issue Command Line Interface commands and to operate in SOL mode), you must connect the telnet session to the dpcproxy by specifying (in the telnet command line) the port on which dpcproxy is listening.

Once the Command Line Interface session over dpccli is running and the connection to the intended server is established, you can begin issuing Command Line Interface commands to that server at the dpccli prompt. If connecting via telnet, the same dpccli prompt is displayed when in Platform Control mode (default), and you can issue Command Line Interface commands at the dpccli prompt over telnet.

Using telnet for both Platform Control and SOL Modes

Serial over LAN mode requires a telnet session from the managing console to the Network Proxy server, regardless of which operating system (Microsoft Windows* or Linux*) you are running on either system. Start the telnet session to the remote server as follows:

1. At the operating system command prompt, type

   ```
   telnet xxx.xxx.xxx.xxx 623 <Enter>
   ```

   The xxx represent the IP address of the system running the Network Proxy. This may be a central network server with the Proxy installed. If you are connecting to the local system, use "localhost" instead of the system's IP Address. The 623 represents the default Port address required for Command Line Interface connections. If this port address has been changed while executing the dpcproxy command, use that port address. For example: telnet 10.7.162.58 623 or telnet localhost 623
2. At the "Server:" prompt, provide the IP Address or DNS Name of the server to which you want to connect.
3. Provide the BMC username and password for the target system.

After authentication is performed, you will see a login successful message and the dpccli> prompt (even over telnet, Command Line Interface starts in Platform Control mode by default). You can now enter Command Line Interface commands or switch to SOL Console Redirection mode.

Intel SNMP subagent

SNMP Subagents are SNMP extension agents that provide interfaces and databases for retrieving server hardware information and for monitoring server health status on the network using the SNMP protocol.

The Management Information Base (MIB) file that accompanies each SNMP subagent contains the definitions of the management information the SNMP subagent can access, with each definition distinguished by a unique object identifier (OID). Each SNMP subagent has its own MIB file and OID. The SNMP subagents support SNMP-based access (GETs, SETs and TRAPs) to the instrumented components on the managed server, collecting and returning information as requested by a management system.

The subagents plug into the SNMP Master Agent infrastructure supported by the operating system and respond to queries and sets filtered to the subagents by the master agent, based on the OID specifying the data defined in the MIB to be retrieved or set.

SNMP Master Agent

You must install the SNMP Master Agent on the managed server.

- For supported Linux* operating systems, use the net-snmp package.
- For supported Microsoft Windows* operating systems, use the SNMP Service included in the Microsoft Windows* operating system.

For systems running the Microsoft Windows* operating system, the SNMP subagent is implemented as a dynamic link library (DLL) and is configured in the Registration Database.

For Linux* systems, the SNMP subagent is implemented as an rpm package. It is installed, configured and started as a service. The SNMP master agent (net-snmp) communicates with the subagent through Agent protocol.

Install the Intel SNMP Subagent

For Microsoft Windows* operating system-based systems, the SNMP service (available on the operating system installation CD) must be installed first. To install the SNMP Subagents on a Linux* system, run the install script installed with the SNMP Subagent:

```
./snmpsubagentinstall.sh
```

Features of the SNMP Subagent

Through basic SNMP GETs, SETs, and TRAPs, the SNMP Subagent provides the following functionality for managing servers:

- Accessing sensor data
- Viewing and modifying threshold settings
- Reading the SMBIOS tables
- Providing overall system health status

Other Tools

In addition, the BMC can be accessed by standard, off-the-shelf terminal or terminal emulator utilities such as open source IPMITOOL or IPMIUtility that allow access to sensor status information, and power control.

The end user owns the risk of using un-validated open source utilities.

Scenarios and best practices

This chapter provides examples that show how to make the QSSC-S4R server platform Server Management interface to work. Topics covered in this chapter include:

- Configure BMC for OOB function using SYSCFG
- Remotely manage Intel server use DPCCLI

Configure Integrated BMC

This is the step-by-step minimum configuration requirements to enable the Integrated BMC for out-of-band communication over a LAN connection.

Minimum configuration requirements:

1. IP source (static or DHCP), IP Address, Subnet mask
2. Enable one user and set password for this user
3. Enable user's privilege level
4. Enable text-based console redirection (serial Over LAN - SOL), if needed

The Intel® System Configuration Utility (SysCfg) is used to configure the BMC for out-of-band management. SysCfg is a command-line utility that can be used to save and restore BIOS and firmware settings to a file or to set and display individual settings. SysCfg supports EFI, Windows Pre-installation Environment (WinPE), Microsoft Windows OS and Linux OS. The SysCfg utility for Windows must be installed on the managed server.

For detailed information on configuring the Integrated BMC using the SYSCFG utility, refer to the document available at http://support.intel.com/support/motherboards/server/sb/CS-022714.htm.

Integrated BMC User account configuration

Perform the following steps to configure the Integrated BMC user account settings on the managed server system in order to set the Integrated BMC user password, enable the Integrated BMC user on a Integrated BMC LAN specific channel and to assign the user privilege level to the Integrated BMC user:

1. Double-click the command prompt icon on the desktop to open a command prompt window.
2. Verify the home directory is c:\syscfg before continuing to the next step. If it is something else, change directory to c:\syscfg before continuing.

   Note: All of the following command lines are issued from the home directory c:\syscfg using the Microsoft Windows Command Prompt.

3. To set the password for BMC user 2 (root), type

```
syscfg /u 2 “password”
```

4. To enable the BMC user 2 on BMC channel 1, type

```
syscfg /ue 2 enable 1
```

5. To enable “admin” privilege and payload type to “SOL” for the BMC user 2 on BMC channel 1, type

```
syscfg /up 2 1 admin  sol
```

BMC LAN Channel Configuration

In order to perform remote management, configure the Integrated BMC IP address for remote access. The Integrated BMC LAN channel can be configured for DHCP or assigned a static IP address. Configure the Integrated BMC LAN channel for DHCP unless static is required.

1. To configure the Integrated BMC LAN channel IP information on Integrated BMC channel 1 for DHCP, type

```
syscfg /le 1 dhcp
```

Note: You will configure the BMC LAN channel for DHCP unless otherwise instructed. To assign a static IP address type: syscfg /le 1 static 192.168.1.121 255.255.255.0, where 192.168.1.121 is your assigned static IP address and 255.255.255.0 is the subnet mask.

2. To verify an IP address was successfully assigned to the managed server BMC display the current BMC LAN channel 1 network settings, type

```
syscfg /d lan 1
```

3. Record the Integrated BMC IP Address for your reference.

BMC SOL Configuration

When you connect to the Integrated BMC, you can remotely control the text console including the BIOS menu, via the Serial Over LAN (SOL) function.

1. To enable Serial Over LAN (SOL) on the Integrated BMC channel 1, type

```
syscfg /sole 1 enable admin 115200 5 60
```

The managed server has now been successfully configured for out-of-band management.

BIOS Configuration

The SYSCFG utility supports not only the configuration of BIOS and BMC settings but it also provides the capability to save and restore BIOS and BMC firmware settings both in binary and in text mode from a text file, known as INI file. The advantage of using an INI file is that you can modify and change the values of any of the settings available in the INI file. This human readable INI file is not only a vehicle for mass deployment but also enables easy modification of existing server settings. In this section describes how to modify select BIOS settings and how to save the Integrated BMC and BIOS setting to the .ini file.

1. To disable BIOS setting “Quiet Boot”, type

```
syscfg /bqb disable
```

2. Console redirection must be enabled and set up in BIOS to match the SOL settings which are enabled by default. SYSCFG can be used to configure console redirection. Follow the steps below to configure Console Redirection:

```
# 00 - Disable, 01 - Serial Port A, 02 - Serial Port B
syscfg /bcs "console redirection" 1
# 00 - Disable, 01 - Enable
syscfg /bcs "legacy OS redirection" 01
```

3. To save both BMC and BIOS settings to the syscfg INI file, type

```
syscfg /s ini
```

4. Use wordpad to open syscfg.ini to view current settings.

Click Start > All Programs > Accessories > WordPad

On the File menu, click Open and browse to the c:\syscfg directory to select the syscfg.ini file. Search the syscfg.ini to view the changes you have made in the lab so far.

5. The following is a listing of the new setting configurations that is completed using syscfg:

```
GlobalUserStatus=Disable        ------------- GlobalUserStatus=Enable
UserAccessCh1=Disable           ------------- UserAccessCh1=Enable
HostIP=0.0.0.0                  ------------- HostIP=192.168.1.12x    (x = Station number)
SubnetMask=0.0.0.0              ------------- SubnetMask=255.255.255.0
SOLEnable=Enable
PrivilegeLevelLimit=User        -------------- PrivilegeLevelLimit=Admin
SolNumberOfRetries=7            -------------- SolNumberOfRetries=5
SolRetryInterval=500            -------------- SolRetryInterval=60
SolBaudRate=38400               -------------- SolBaudRate=115200
QuietBoot=Enable                -------------- QuietBoot=Disable
…
```

Note: SYSCFG does not restore all settings in the saved INI file. For example - the Host IP is not restored

Remote Management

The Command Line Interface (CLI) console runs on the management console (client system/laptop) and enables communication between the management console and the network proxy, which in turn communicates to the managed server. The Command Line Interface lets you control a server from the command line rather than from a graphical user interface. You can enter Intel® Command Line Interface commands at a command prompt or from a script file to do the following:

Remotely power on or off a server or reset the server

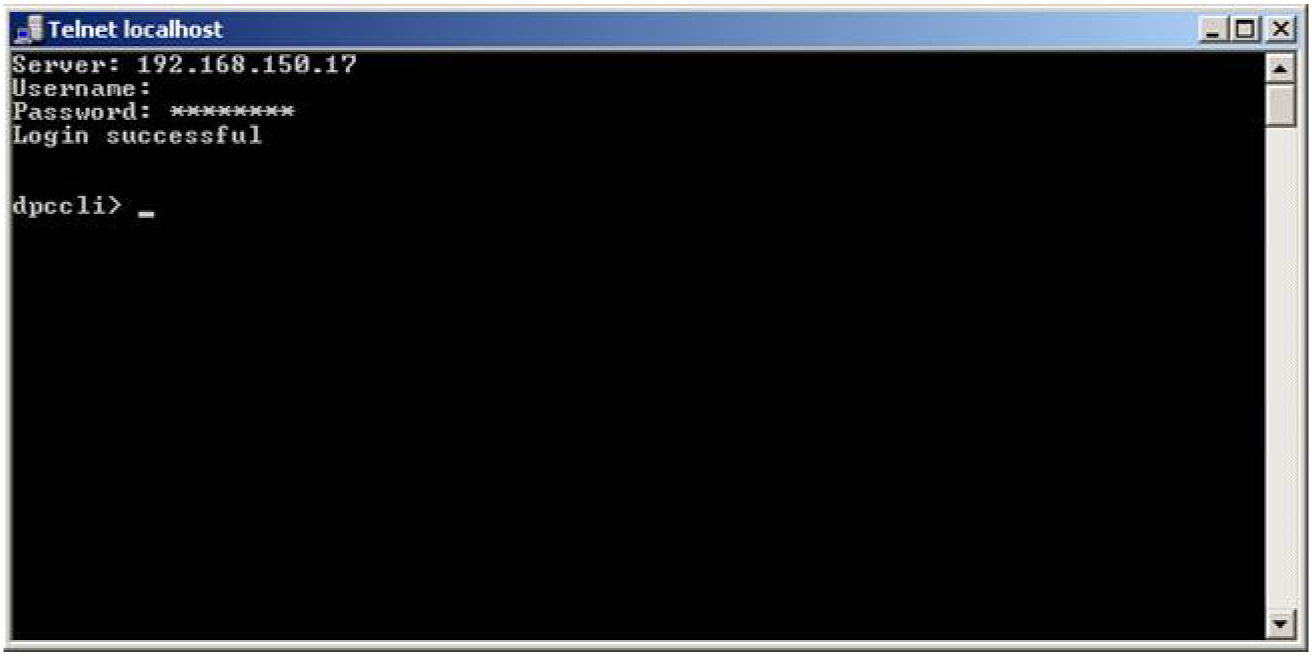
Read sensor values

Operate remote server in SOL mode

Telnet is used to remotely manage the server. When using telnet to connect to the remote server (to issue DPCCLI commands and to operate in SOL mode), you must connect the telnet session to the dpcproxy by specifying (in the telnet command line) the port on which dpcproxy is listening:

1. On the management laptop, double click the Telnet Localhost 623 desktop icon. You will now connect to the managed server.
2. At the server prompt, type the assigned Integrated BMC IP Address from step 3 in section 2.4.2. For example: Server: xxx.xxx.xxx.xxx
3. At the username prompt, press the Enter key. You are logging in under the anonymous user account. No user name is assigned.
4. At the password prompt, enter “password”.

   “Login successful” should be displayed on your screen. If not, please contact your instructor.



```
Server: 192.168.150.17
Username:
Password: ********
Login successful

dpccli> _
```

The following tasks demonstrate some of the features of the Command Line Interface utility. You can monitor system information, retrieve and save the system event log and start a SOL session.

1. To read the temperature sensors of the remote managed system, type:

```
dpccli> sensors ¡Vv ¡VT temp
11/14/2008 | 13:58:32 | Baseboard Temp     | ok      |  28.00 | Celsius
11/14/2008 | 13:58:32 | P1 Mem Margin      | ok      |   1.00 | Celsius
11/14/2008 | 13:58:32 | IOH Therm Margin   | ok      | -28.00 | Celsius
11/14/2008 | 13:58:33 | P2 Mem Margin      | ok      |   0.00 | Celsius
11/14/2008 | 13:58:33 | P1 Therm Margin    | ok      | -64.00 | Celsius
11/14/2008 | 13:58:33 | P2 Therm Margin    | ok      | -61.00 | Celsius
```

2. To read the fan speeds of the remote managed system, type:

```
dpccli> sensors ¡Vv ¡VT fan
11/14/2008 | 13:59:09 | Processor 1 Fan    | ok      | 6120.00 | RPM
11/14/2008 | 13:59:09 | Processor 2 Fan    | ok      | 6120.00 | RPM
11/14/2008 | 13:59:09 | Memory 1 Fan       | ok      |    0.00 | RPM
11/14/2008 | 13:59:09 | Memory 2 Fan       | ok      | 4152.00 | RPM
11/14/2008 | 13:59:09 | System 1 Fan       | ok      |    0.00 | RPM
11/14/2008 | 13:59:09 | System 2 Fan       | ok      | 2688.00 | RPM
11/14/2008 | 13:59:09 | System 3 Fan       | ok      |    0.00 | RPM
11/14/2008 | 13:59:09 | System 4 Fan       | ok      | 2832.00 | RPM
dpccli>
```

3. To read all system sensors, type:

```
dpccli> sensors ¡Vv
11/14/2008 | 13:58:03 | BB +1.1V IOH       | ok      |   1.28 | Volts
11/14/2008 | 13:58:04 | BB +1.1V P1 Vccp   | ok      |   0.84 | Volts
11/14/2008 | 13:58:04 | BB +1.1V P2 Vccp   | ok      |   0.84 | Volts
```

```
11/14/2008 | 13:58:04 | BB +1.5V P1 DDR3     | ok          |    1.52 | Volts
¡K
dpccli>
```

You can use the Command Line Interface to display and save the system event log on remote management clients.

4. To display and save the System Event Log (SEL) in text format on remote system (where the dpcproxy is running), type:

```
dpccli> displaylog -F csv -O c:\ER.sel
…
1,Pre-Init Time-stamp ,Processor #0x60,Processor Presence detected
2,Pre-Init Time-stamp ,Processor #0x61,Processor Presence detected
3,Pre-Init Time-stamp ,Power Unit #0x01,Power Off/Down
4,Pre-Init Time-stamp ,Power Unit #0x01,Power Off/Down
5,Pre-Init Time-stamp ,System Event #0x83,Timestamp Clock Synch.  Event Is First Of Pair.SEL TimeStamp Updated.
6,11/14/2008,11:20:42,System Event #0x83,Timestamp Clock Synch.  Event Is Second Of Pair.  SEL TimeStamp Updated.
7,11/14/2008,11:21:47,System Event #0x01,OEM System Boot Event
…
dpccli>
```

5. In the previous step, you saved the System Event Log (SEL) to c:\ER.sel on the remote management console. To view the SEL, open the ER.sel file in notepad. (Open Windows Explorer on the management console (laptop) and right-click on the ER.sel file and open with notepad.)

Note: To save the SEL to HEX format remotely, type: displaylog ¡VF hex ¡VO c:\ER.sel.

Using Serial Over LAN

1. To remote power-off the managed system, type:

```
dpccli> power –off
```

2. To power on the managed system and start a SOL session, type:

```
dpccli> power -on –console
```

3. Monitor the system BIOS boot up screen via Serial Over Lan (SOL):

Press “F2” go to BIOS menu and select “Discard Changes and Exit”

4. To exit the Telnet session and close the Telnet localhost window, type “~.”

Chapter 4: Serviceable Components

Note: This chapter provides instructions for adding and replacing hot swappable and serviceable system components and memory DIMMs.

Before You Begin

Before working with your server product, pay close attention to the Safety and Regulatory Information on page iii.

Tools and Supplies Needed

- Phillips (cross head) screwdriver, #2 bit
- Flat-head screwdriver
- Antistatic wrist strap and conductive foam pad (recommended)

System References

Unless otherwise noted, all references to left, right, front, top, and bottom assume the reader is facing the front of the chassis as it would be positioned for normal operation.

Installing the Protective Ground Wire

A bond wire of at least 18 AWG copper stranded wire and at least 1 meter (3.28 feet) long is required to ground the server system. To install the protective grounding wire, follow the steps below.

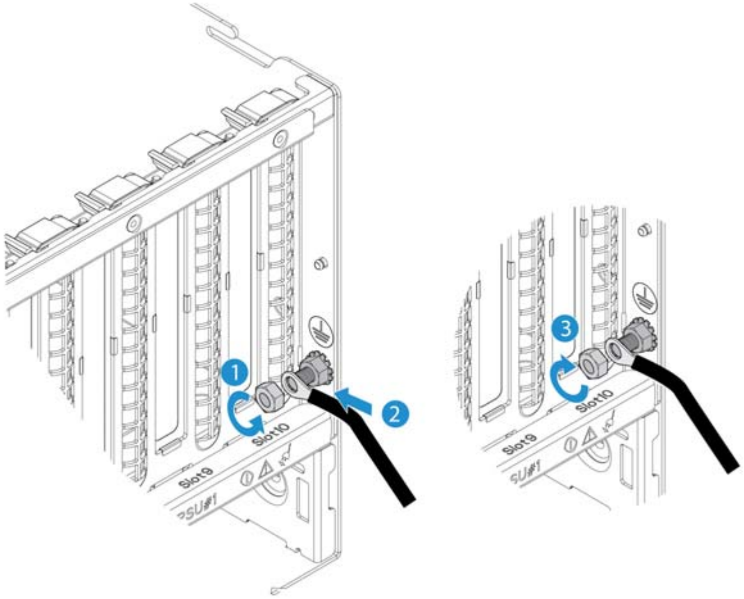


Figure 31. Installing the Ground Wire

1. Locate the grounding bolt on the chassis rear left side wall designated by the ⏚ symbol
2. Remove the outer nut from the bolt. See "1" in the figure above.
3. Attach the bond wire ring terminal with the lug on the inner nut. See "2" in the figure above.
4. Replace the outer nut. See "3" in the figure above.

Note: The grounding wire lug goes between the two nuts on the bolt.

Adjust the bond wire to fit into the cable management arm.

Removing and Installing the Chassis Cover

Warning *Make sure the rack is anchored securely so it does not tilt forward when the server is extended. A crush hazard exists if the rack tilts forward. This could cause serious injury.*

Caution

- *For proper cooling and airflow, do not operate the server for more than three minutes with the cover removed. Do not leave the chassis cover open or a system fan removed any longer than necessary; system cooling could be reduced.*
- *The server comes with a removable top cover that allows the PCIe cards, memory risers, and the system fans to be hot swapped, and other system components to be serviced. Except for components described in this chapter, a qualified service technician must perform all servicing.*
- *Provide electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components.*

Removing the Top Cover

Before removing the top cover, observe these safety guidelines:

1. If you are not replacing a hot swap component:

   Turn off and disconnect all peripheral devices connected to the server.

   Power down the system by pressing and holding the power button on the front of the chassis for several seconds.

   After the server shuts down, unplug all AC power cords to remove standby power from the system.
2. If the system is mounted in a rack, release the two captive screws and slide the system out far enough to expose the entire top cover.
3. Remove the one screw in the top cover. See letter “A” in the figure below.
4. Press down on the two latch buttons on the top cover and slide the top cover off the latches. See letter “B” in the figure below.
5. Slide the top cover toward the rear until it stops, and then lift the cover to remove it. See letter “C” below.

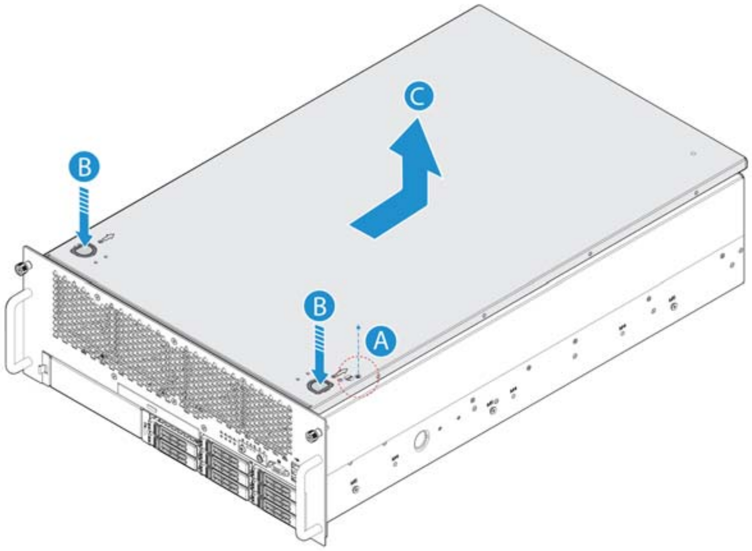


Figure 32. Removing the Chassis Cover

Installing the Top Cover

1. Place the cover over the chassis so that the side edges of the cover sit just inside the chassis sidewalls and the tabs on the cover align with the slots in the chassis.

2. Slide the cover forward until it clicks into place. See letter "A" in the figure below.

3. Replace the one screw in the top cover. See letter "B" in the figure below.

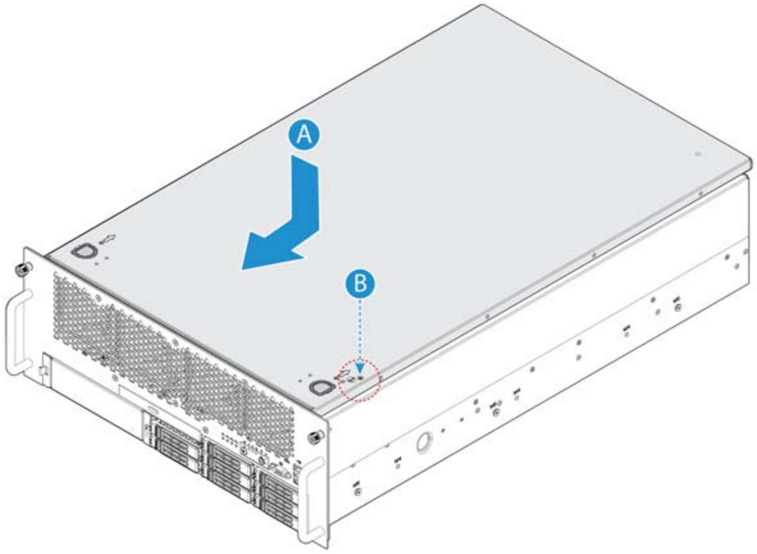


Figure 33. Installing the Chassis Cover

4. Release the locking latches on the front of the inner rails.

Warning *DO NOT release the locking latching in the middle of the inner rails. These latches release the server from the rails completely. Two people are required to physically handle this server. Serious hazard warning.*

5. Slide the system back into the rack.

6. Secure the two rack knobs.

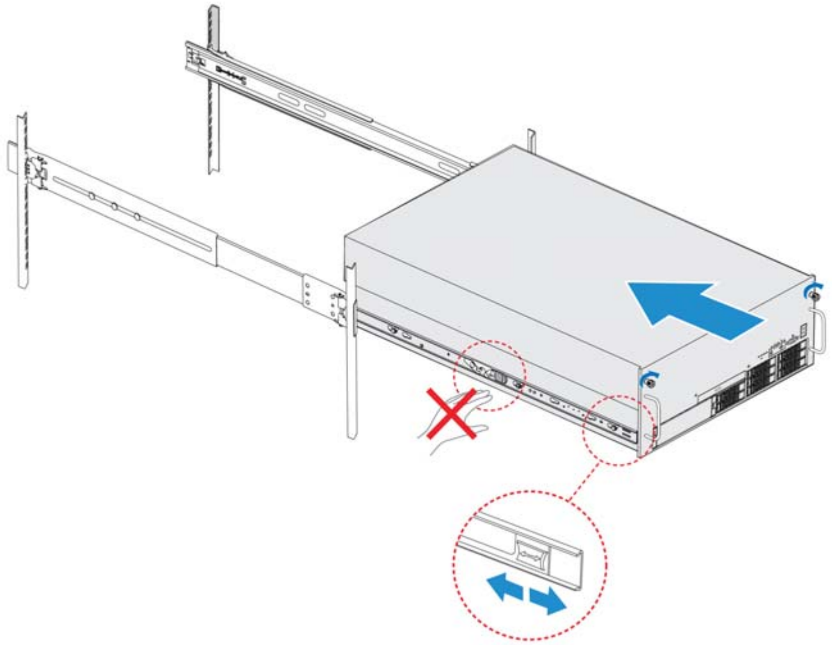


Figure 34. Replacing the Server

7. Reconnect all peripheral devices and the AC power cords.

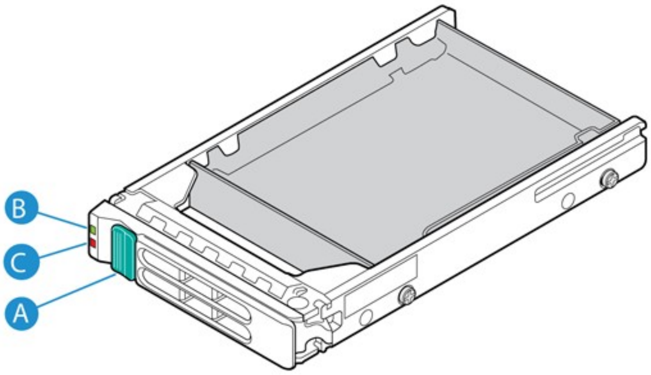
Hot-Swapping a Hard Drive

The server supports eight hot swap drive carriers for the Enterprise SKU and six carriers for the Value SKU. Each carrier holds a standard 2.5-inch SATA or SAS hard drive.

The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive. If a drive is in a redundant configuration, you can install or replace a hot swap hard drive without powering down the server.

Caution *To ensure proper airflow and server cooling, all drive bays must contain either a carrier with a hard drive installed in it or a carrier with a HDD blank installed.*

The drive carriers contain light-pipes that allow LED indicators to display the hard drive status.



Item	Feature	LED State	Description
A.	Latch		
B	LED	Green Blinking	HDD access or spin up/down
C	LED	Amber – On	HDD fault
		Amber – Blinking	Predictive failure, rebuild, identify
		Off	No access and no fault

Figure 35. Hard Drive Carrier

Note: For a full description of LED behavior and differences between SAS and SATA drives refer to Table 17. 8X HDD Activity LED Functionality on the Hot-Swap Backplane (HSBP) on page 32

Removing a Hard Drive Carrier

1. Press the green drive carrier latch. See "A" in the following figure.
2. Open the bezel fully. See "B" in the following figure.
3. Pull the bezel to remove the drive carrier from the chassis. See "C" in the figure.
4. Place the drive carrier on a clean, static-free work surface.

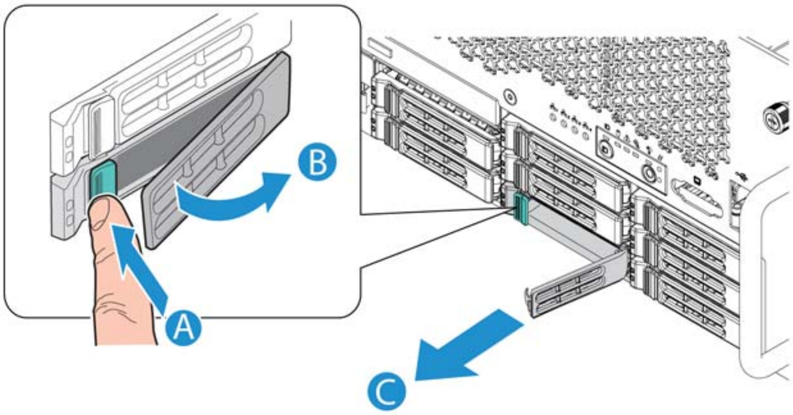


Figure 36. Removing a Hard Drive Carrier

Mounting a Hard Drive in a Carrier

1. Remove the hard drive from the protective wrapper and place it on a clean ESD protected work surface.
2. Set any jumpers and/or switches on the drive according to the drive manufacturer's instructions.
3. If the drive carrier is installed in the chassis, remove it and place it on a clean static-free work surface. For instructions, see "Removing a Hard Drive Carrier" on page 54.
4. Remove the four screws that hold the HDD blank in place. See letter "A" in the following figure.
5. Remove the HDD blank from the carrier. See letter "B" in the figure.
6. Store the HDD blank for future reinstallation.

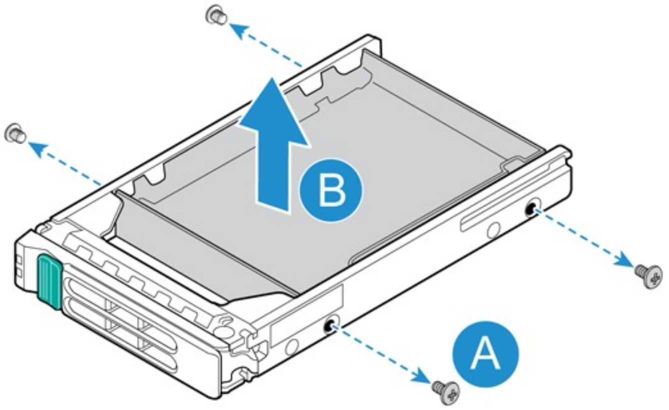


Figure 37. Removing the HDD Blank from the Hard Drive Carrier

7. Position the drive in the carrier with the label-side up and the connector end of the drive facing the back of the carrier. See letter "A" in the figure.
8. Align the holes in the drive to the holes in the drive carrier slide track and replace the four screws that were attached to the blanks. See letter "B" in the figure.

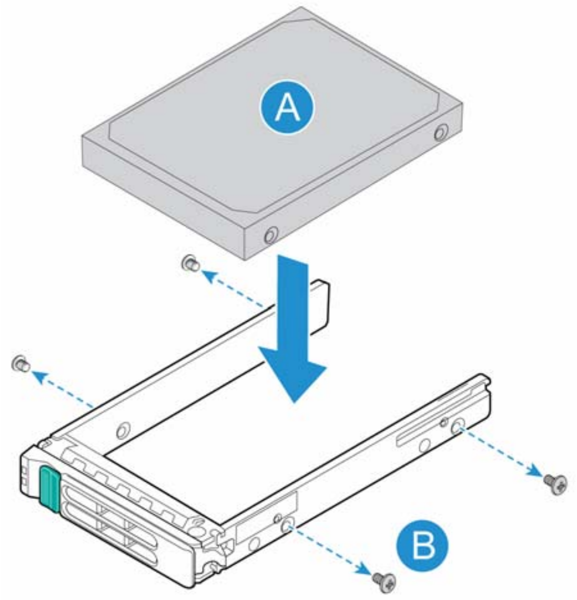


Figure 38. Attaching the Hard Drive to the Carrier

Installing a Hard Drive Carrier

1. With the drive carrier handle fully open, slide the drive carrier all the way into the drive bay in the chassis. See letter “A” in the following figure.
2. Close the drive carrier handle to lock the hard drive carrier in position. See letter “B” in the figure.

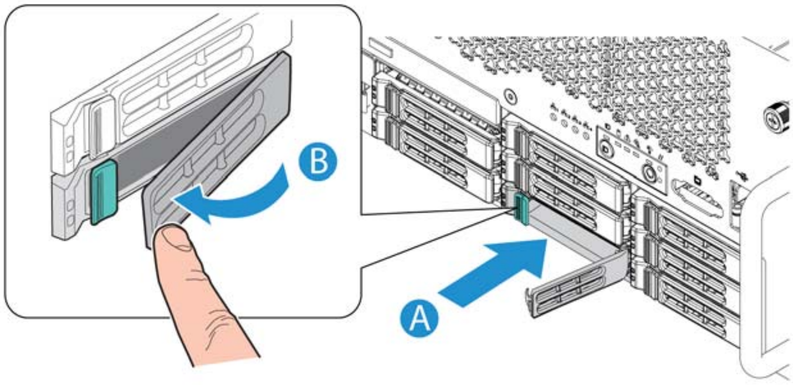
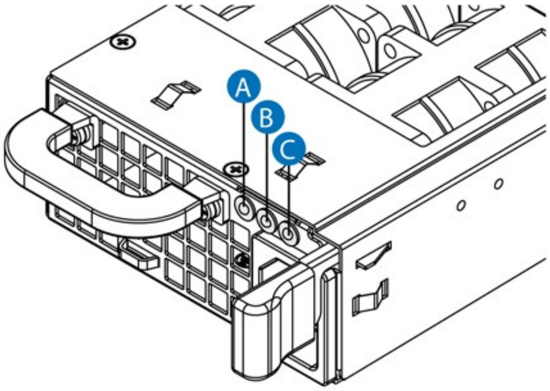


Figure 39. Installing the Hard Drive into the Server

Hot Swapping a Power Supply

If your server is configured with four power supplies, you can replace a failed or failing power supply without powering down the server. Use the LEDs at the front of the power supply to determine the power supply status. Each power supply module has three status LEDs above the input connector. If the center LED is lit, the power supply needs to be replaced.



LED	LED Name	Symbol	Color/LED State	Description
A	DC Power Redundancy status	⏻	Green – Blinking	Cold Redundancy Mode
			Green - On	PSU on and running
B	Power Supply Failures and Warnings	⚠	Amber – Blinking	PSU warning event operation continuing
			Amber – On	PSU critical even shutdown
C	AC Power Supply Input Status	🔌	Green – Blinking	AC power not present
			Green – On	AC power present

Figure 40. Power Supply Indicators

Caution *Because of chassis airflow disruption, a power supply bay should never be vacant for more than three minutes when the server power is on. Exceeding five-minutes might cause the system to exceed the maximum acceptable temperature and possibly damage system components.*

1. Remove the AC power cord from the power cord clamp. See “Figure 42. PSU with power cord clamp.” for location of cord clamp.
2. Remove the AC power cord from the power supply to be removed. See letter “A” in the figure below.
3. Press in the latch to release the power supply module. See letter “B” in the figure below.
4. Pull the power supply from the chassis and set it on a clean, ESD-protected work surface. See letter “C”.

   Note: Power supply redundancy is available if four power supplies are installed.

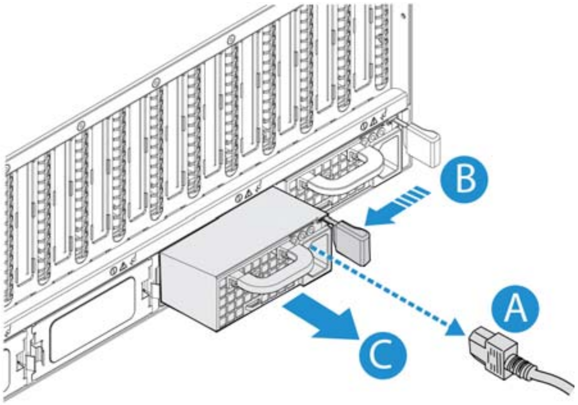


Figure 41. Removing a Power Supply

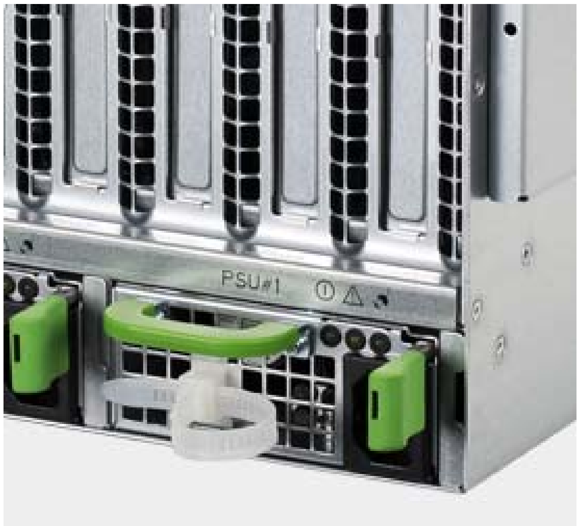


Figure 42. PSU with power cord clamp.

5. Remove the new power supply from the protective packaging and place it on a clean ESD protected work surface.
6. Slide the new power supply module into the power supply bay, with the AC inlet connector on the right side, until it clicks and latches in place. See letter “A” in the figure below.

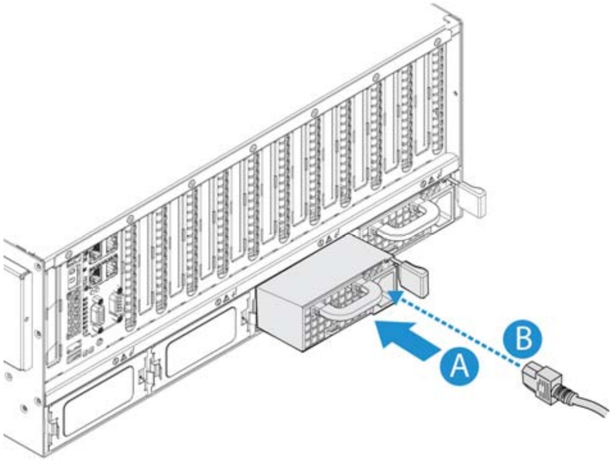


Figure 43. Installing a Power Supply

7. Plug the power cord into the AC receptacle on the power supply. See letter “B” in the figure above.
8. Secure the AC power cord with the power cord clamp.
9. Use the LEDs on the power supply to confirm the power supply is functioning.

Removing and Installing Hot Swap PCI Express Add-in Cards

Note: Cards can be hot swapped only in PCIe slots 1, 2, 6, and 7. The server must be powered down to install or remove a card from PCIe slots 3 through 5, 8 through 10 and the SAS riser slot. When looking at the system from the front, slot 1 is on the right.

Removing a Hot Swap PCIe Card

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.
2. Disconnect any cables attached to the card.
3. Press the LED light pipe switch on the PCIe card cover, and wait for the LED to turn off. See letter “A” in the following figure.
4. Rotate the green retention latch at the top front of the card slot into the up position. See letter “B” in the following figure.

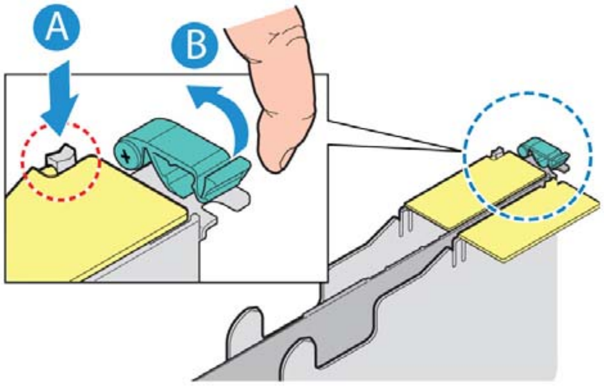


Figure 44. Removing a hot-swap PCIe card

5. Lift the flap on the PCIe divider. See letter “C” on the following figure.
6. Pull up on the card to remove it. See letter “D” in the figure.

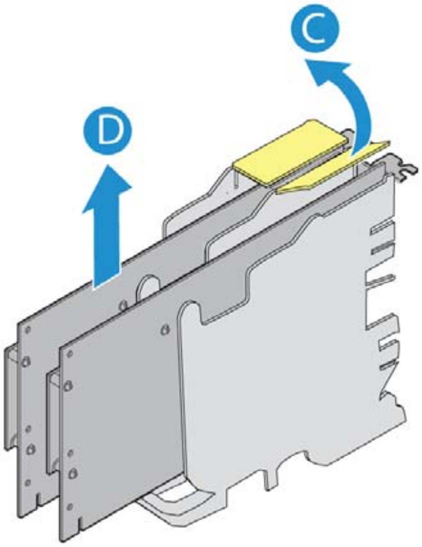


Figure 45. Removing a PCIe card

7. Store the card in an antistatic protective wrapper.
8. To install a replacement PCIe card: see “Installing a Hot Swap PCIe Card” on page 59.
9. Install an expansion slot cover by sliding it down to cover the opening if no PCIe replacement card is installed.
10. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Installing a Hot Swap PCIe Card

Caution *Only PCIe add-in cards in PCIe slots 1, 2, 6, and 7 can be hot swapped. When looking at the system from the front, slot 1 is on the right.*
If you are removing a PCIe card in PCIe slots 3 through 5 or 8 through 10, see “Installing and Removing Non-Hot Swap PCI Express Add-in Cards” on page 84.

1. If your operating system supports it, use your operating system or GUI application to power down the PCIe slot.
2. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.
3. Being careful not to touch the components or gold edge-connectors on the add-in card, remove the card from the anti-static bag and place it on a clean, ESD protected work surface.
4. Rotate the green retention latch at the rear of the card slot into the up position.
5. Remove the expansion slot cover by sliding it up.
6. Lift the flap on the PCIe divider.
7. Align and slide the adapter board down until it seats in its connector.
8. Press the card down firmly until it seats into the slot. See letter “A” in the following figure.
9. Close the flap on the PCIe divider. See letter “B” in the following figure.

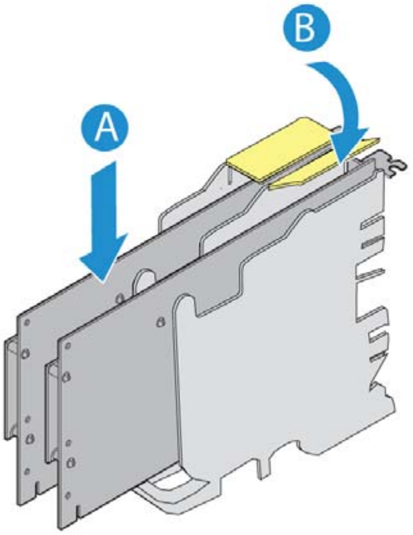


Figure 46. Installing a PCIe Add-in Card

Caution *Some accessory/option board outputs exceed Class 2 or limited power source limits. Use appropriate interconnecting cabling in accordance with the national electrical code.*

1. Rotate the green retention latch at the rear of the card slot into the down position. See letter "C" in the following figure.
2. Connect any required cabling to the PCIe add-in card.
3. If using the operating system hot-plug interface:

   Wait for the software user interface to appear on your monitor and then confirm the device to be enabled.

   Wait for the power LED to turn on.

   If using the hardware hot-plug interface:

   Press the attention button for the slot. See letter "D" in the following figure. If you need to abort the hot-plug operation, press the attention button again within five seconds.

   Wait for power LED to turn on.

   Note: For either the operating system interface or the hardware hot-plug interface, if the amber attention LED is on, a power fault has occurred. You may need to remove the adapter, wait for the LED to turn off, and re-start the hot insertion.

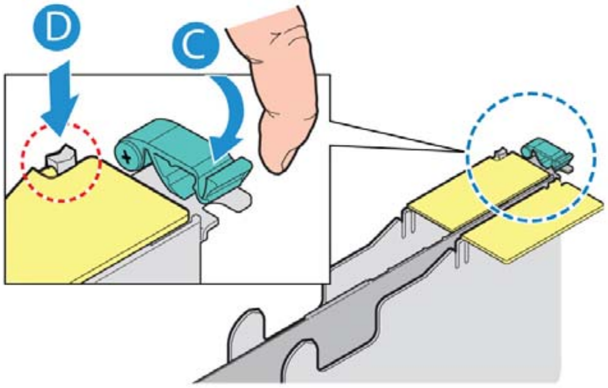


Figure 47. Adding a Hot Swap PCIe Add-in Card

4. Install the top cover. For instructions, see "Installing the Top Cover" on page 52.

Removing and Installing System Fans

On the Enterprise system, eight cooling fans are located at the front of the chassis, seven for normal operation, with an additional one for redundant operation in the event of fan failure. The top cover must be removed before these fans can be serviced. You can replace a failed cooling fan assembly without turning off the power to the server only if the remaining system fans are fully functional. Each fan assembly uses an amber LED to indicate a failed fan condition. If the amber LED is on, the fan assembly needs to be replaced. The LED remains off during normal operation.

Warning *System fans cannot be hot swapped in the Value SKU where a four fan non-redundant fan system is the default configuration. See "Removing System Fan Modules" on page 62 and "Installing the System Fan Modules" on page 63 for details.*

Caution

- *System cooling is reduced during the fan replacement process. Do not leave a system fan removed for longer than three minutes. Should the system be left open for extended periods allow time for temperature recovery before reopening.*
- *Do not touch the fan blades while they are turning.*

Removing the Hot-Swap Fan Modules

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 51.

2. Locate the fan assembly you are replacing. If a fan in the assembly has failed, the amber LED on the fan model lights up.

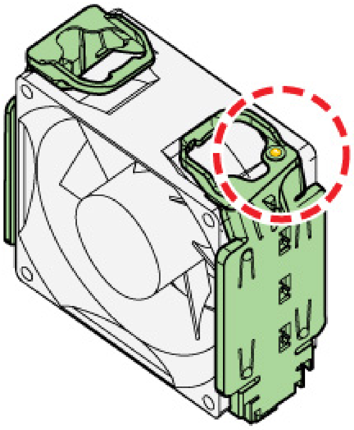


Figure 48. Fan LED Location

3. Grasp the fan by the finger latches and squeeze together.

4. Lift the fan upward. See the following figure.

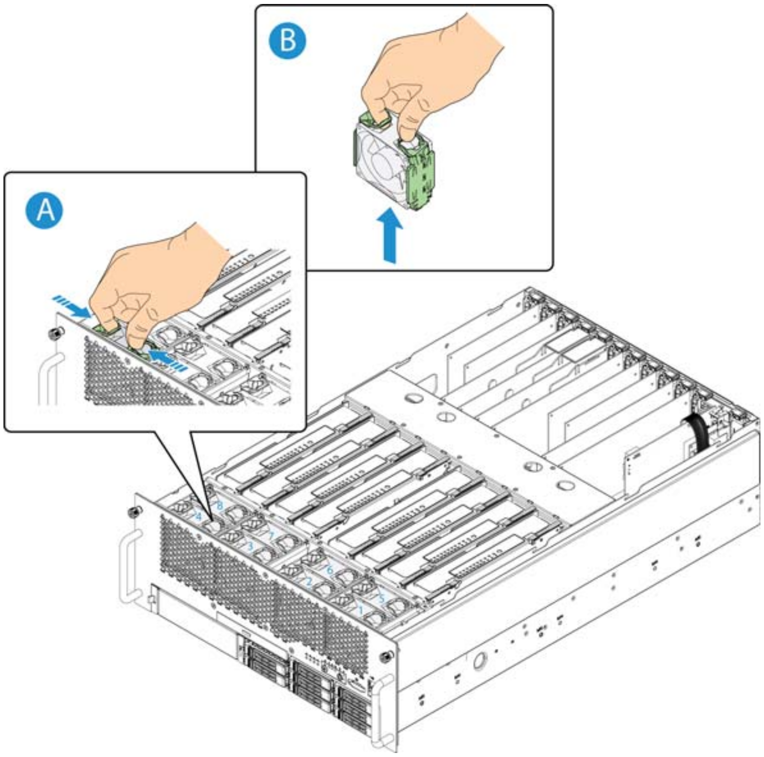


Figure 49. Removing the System Fans

Installing the Hot-Swap Fan Modules

1. Lower the replacement fan into the fan bay.
2. Push down on the fan until it clicks into place.

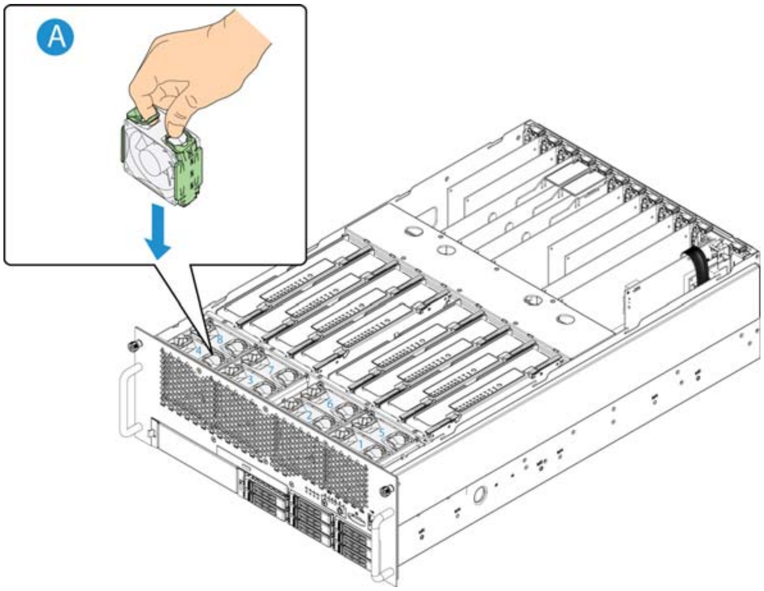


Figure 50. Installing the System Fans

3. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Removing System Fan Modules

In a non-hot swap fan configuration follow the steps below to remove a fan module.

1. Power down the system.
2. Remove the top cover. For instructions, see “Removing the Top Cover on page 51.
3. Locate the fan assembly you are replacing. If a fan in the assembly has failed, the amber LED on the fan model lights.
4. Grasp the fan by the finger latches and squeeze together.
5. Lift the fan upward. See the following figure.

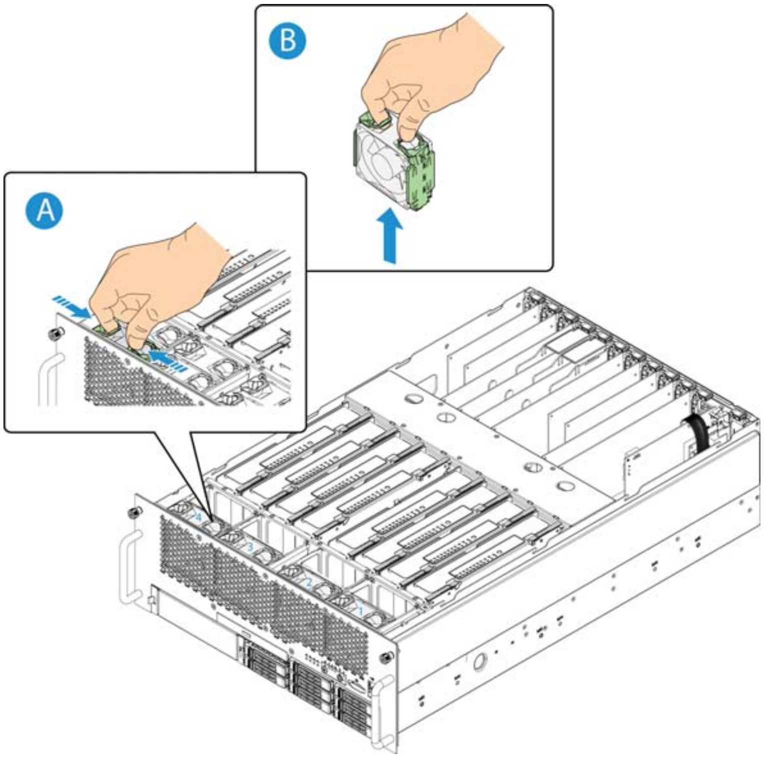


Figure 51. Removing Non-Redundant System Fans

Installing the System Fan Modules

In a non-hot swap fan configuration follow the steps below to install a fan module.

1. Lower the replacement fan into the fan bay.
2. Push down on the fan until it clicks into place.

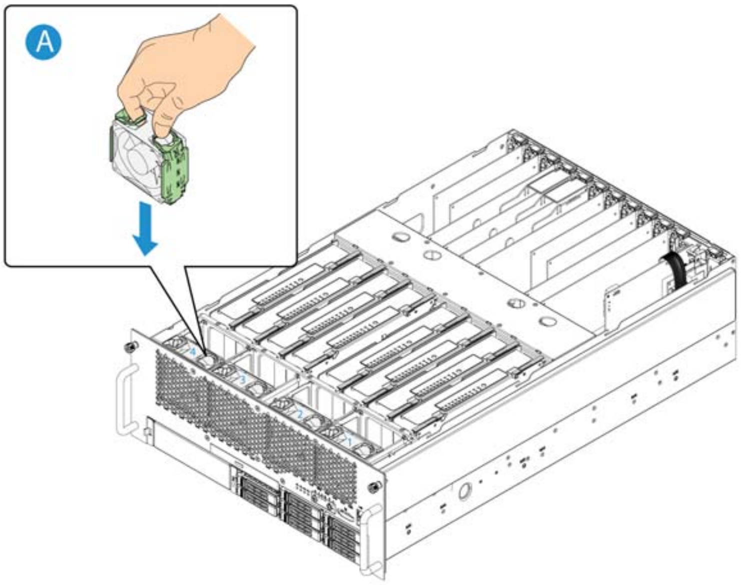


Figure 52. Installing Non-Redundant System Fans

3. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.
4. Power up the server system.

Hot Swapping Memory Risers

At least one CPU and one memory riser with two DIMMs must be installed for the server to function.

The system supports only DDR3 registered DIMMs.

If two memory risers are installed, one of the risers may be removed while the system is operating. This allows for the replacement of faulted DIMMs while ensuring continuous operation of the server. Memory riser hot-swap does not alter overall memory capacity.

Warning *The CPU must have at least two DIMMS supporting it during hot swap operations. Memory Hot-Swapping is only supported in the mirrored mode. NUMA should be enabled in BIOS setup to perform memory hot swap operation.*

Removing a Memory Riser

Warning *Memory dividers must be installed at all times during operation for proper airflow.*

Warning *Defective memory risers removed should be directly replaced in exactly the original configuration. Do not hot swap defective memory in a new configuration.*

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.
2. Press the Attention button on the Memory Riser. See letter “A” on the figure below. The attention LED blinks for 5 seconds then turns off. Then the power LED starts blinking. The power LED blinks until all memory has been flushed from the riser. When the power LED turns off, the Memory Riser is safe to remove.

Note: Pressing the attention button again while the attention LED is flashing cancels the operation.

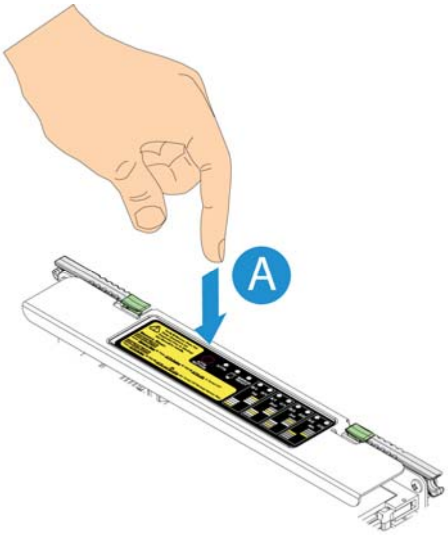


Figure 53. Pressing the memory riser attention button

3. Press the left and right green latches on the memory bracket downward to release the memory bracket levers. See letter “B” in the following figure.
4. Rotate the levers upward to disengage the memory riser from the main board. See letter “C” in the following figure.

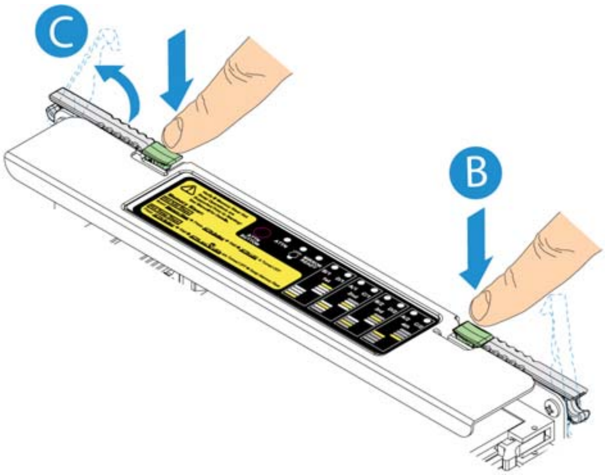


Figure 54. Releasing a memory riser

5. Lift the memory riser by the levers of the memory bracket to pull it from the server as shown in Figure 55.
6. Ensure the fan zone airflow configuration is correct, install or remove a memory air baffle if necessary. For instructions, see “Installing and Removing Memory Air Baffles” on page 67.

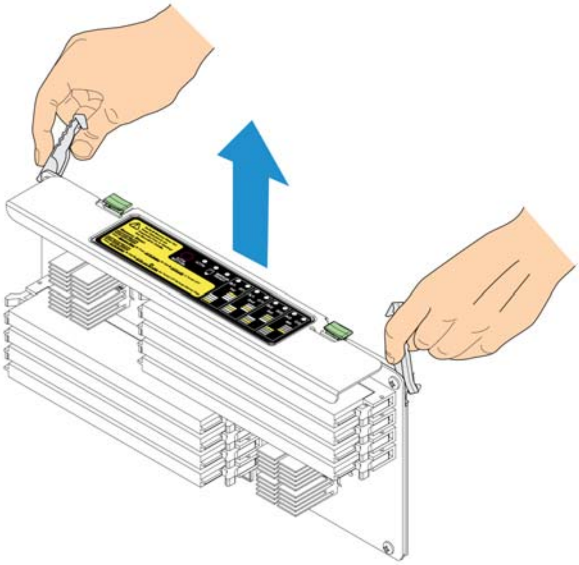


Figure 55. Removing a memory riser

Installing a Memory Riser

Warning *When adding new memory, obey the memory population rules. See "Supported Memory Configuration" on page 71".*

1. Ensure the levers on the memory bracket are in the open / up position.
2. Align the edges of the bracket in the bracket guides and slide the memory riser into the main board.

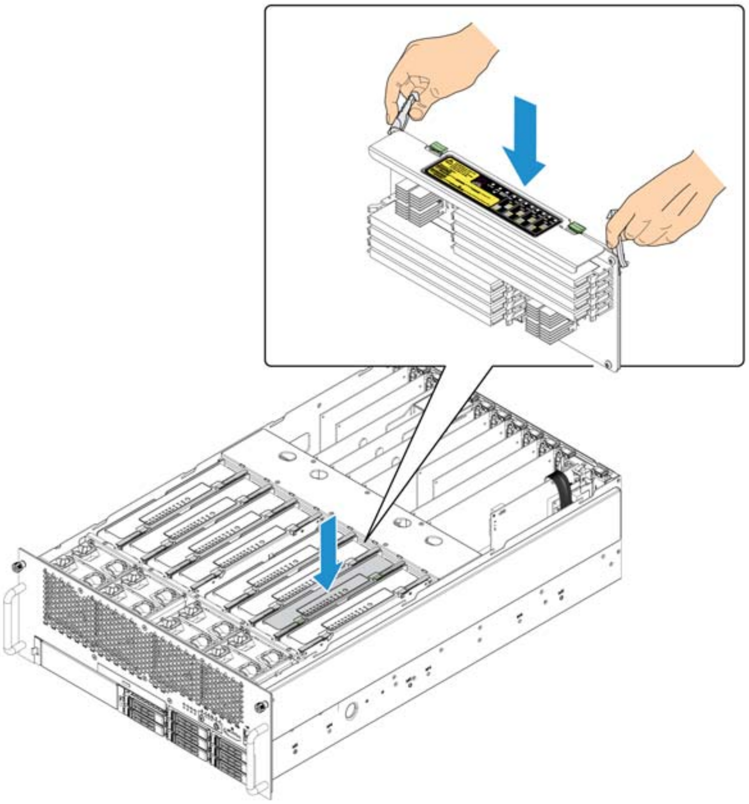


Figure 56. Installing a memory riser

3. Once the board is lowered as far as possible, rotate the levers downward so they latch into place to firmly engage the board into the memory riser slot.
4. Press the attention button. The attention LED and the power LED start blinking. When the attention LED turns off and the power LED turns solid the system has finished adding the memory riser.
5. Ensure the fan zone airflow configuration is correct, installing or removing a memory airflow baffle if necessary. For instructions, see “Installing and Removing Memory Air Baffles” on page 67.
6. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Hot Adding a Memory Riser

The QSSC-S4R system supports memory hot addition to increase memory capacity by adding memory boards on empty memory board slots in runtime.

Warning *Hot Addition requires OS support to accommodate and utilize the additional memory. NUMA should be enabled in BIOS setup to perform memory hot addition operation.*

1. Ensure the levers on the memory bracket are in the open / up position.
2. Align the edges of the bracket in the bracket guides and slide the memory riser into the main board.

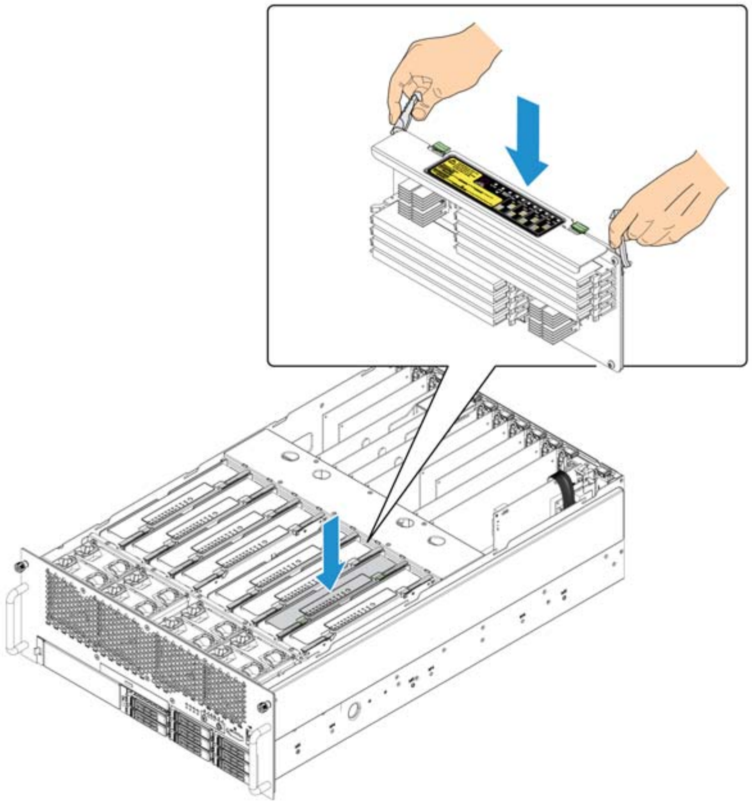


Figure 57. Hot adding a memory riser

3. Once the board is lowered as far as possible, rotate the levers downward so they latch into place to firmly engage the board into the memory riser slot.
4. Press the attention button. The attention LED and the power LED start blinking. When the attention LED turns off, the system has added the memory riser.

Installing and Removing Memory Air Baffles

Each front fan has an internal fan zone comprising of two memory slots. Refer to the figure below.

For proper airflow each fan zone must have one of three configurations:

1. Two memory risers
2. One memory riser and one memory air baffle
3. Two air baffles

Installing a Memory Air Baffle

Install a memory air baffle when a fan zone has one memory riser (only).

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.

2. Place the bottom of the memory air baffle into the slot.

3. Push the top of the air baffle into the slot till it latches in place. See the following figure.

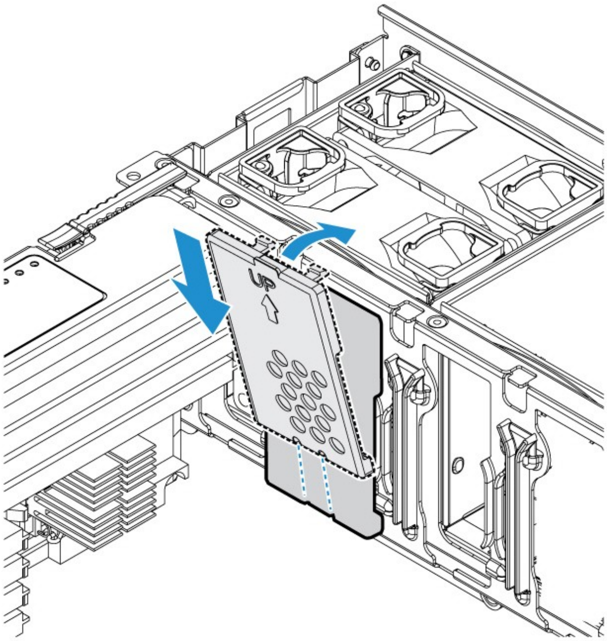


Figure 58. Installing a Memory Air Baffle

4. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Removing a Memory Air Baffle

Remove a memory air baffle when a fan zone has two memory risers installed.

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.

2. Press down on the tab at the top of the memory air baffle to release it, see “1” in the following figure.

3. Lift the memory air baffle out of the system, see “2” in the following figure.

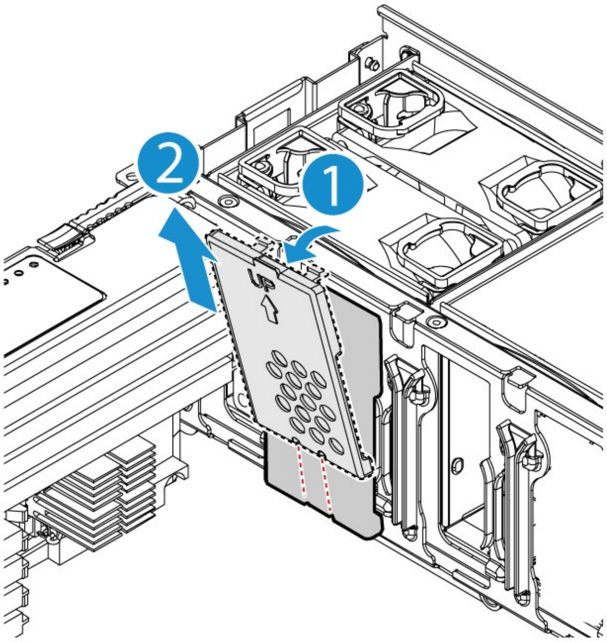


Figure 59. Installing a Memory Air Baffle

4. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Installing and Removing DIMMs

Memory Riser DIMM Slot Locations

The DIMM slots on the memory riser are divided into upper right and lower left DIMM slot areas, numbered in pairs in the order of 1B + 1D, 2B + 2D, 1A + 1C and 2A + 2C, as shown in Figure 60. See ”Supported Memory Configurations” for population rules.

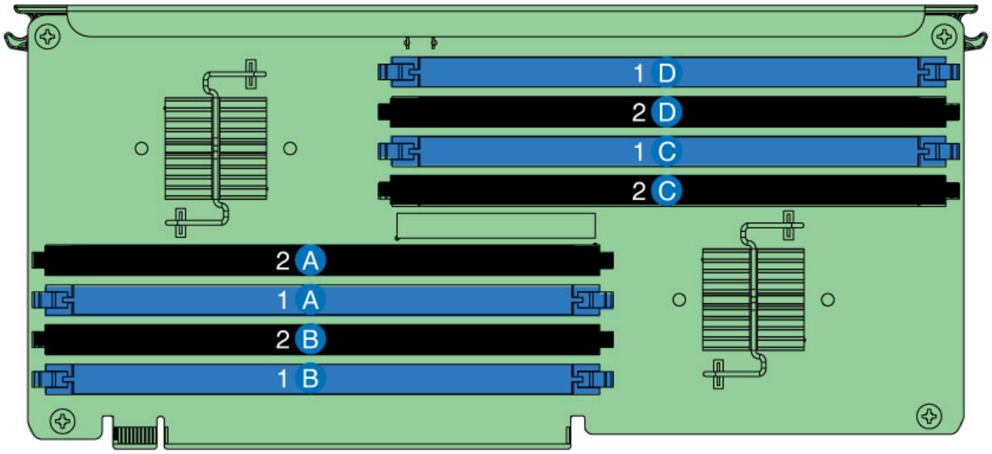


Figure 60. Memory riser DIMM locations

Supported Memory Configurations

Table 21. Standard Intel® Xeon® 7500 Platform 4S Server Platforms DIMM Population Rules describes the memory configurations that are validated on Intel® Boxboro-EX 4S Server platforms.

Table 21. Standard Intel® Xeon® 7500 Platform 4S Server Platforms DIMM Population Rules

Memory Riser 1								Memory Riser 2																
D1B	D1A	D2B	D2A	D1D	D1C	D2D	D2C	D1B	D1A	D2B	D2A	D1D	D1C	D2D	D2C	S1	S2	S3	S4	S	Intra M	Inter M	H	N
X				X												Y				N	N	N	N	2
X				X				X				X				Y				N	Y	N	Y	4
X	X			X	X			X				X				Y				N	N	N	N	6
X	X			X	X			X	X			X	X			Y				Y	Y	N	Y	8
X	X	X		X	X	X		X	X	X		X	X	X		Y				Y	Y	N	Y	12
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Y				Y	Y	N	Y	16
X				X												Y	Y			N	N	Y	N	4
X				X				X				X				Y	Y			N	Y	Y	Y	8
X	X			X	X			X				X				Y	Y			N	N	N	N	12
X	X			X	X			X	X			X	X			Y	Y			Y	Y	Y	Y	16
X	X	X		X	X	X		X	X	X		X	X	X		Y	Y			Y	Y	Y	Y	24
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Y	Y			Y	Y	Y	Y	32
X				X												Y	Y	Y	Y	N	N	Y	N	8
X				X				X				X				Y	Y	Y	Y	N	Y	Y	Y	16
X	X			X	X			X				X				Y	Y	Y	Y	N	N	N	N	24
X	X			X	X			X	X			X	X			Y	Y	Y	Y	Y	Y	Y	Y	32
X	X	X		X	X	X		X	X	X		X	X	X		Y	Y	Y	Y	Y	Y	Y	Y	48
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	64

- **Dx** - Indicates DIMM on the memory risers.
- **Sx** - Indicates that the CPU socket is populated. S0 is CPU socket 1,S1 is CPU socket 2, S2 is CPU socket 3, and S3 is CPU socket 4. A **Y** indicates the CPU socket is populated. Blank indicates the CPU socket is empty.
- **S** – Indicates whether the configuration supports the Spare mode of operation. **Y** indicates a Yes, **N** indicates a No.
- **Intra M** – Indicates whether the configuration supports the Intra Mirroring mode of operation. **Y** indicates a Yes, **N** indicates a No.
- **Inter M** – Indicates whether the configuration supports the Inter Mirroring mode of operation. **Y** indicates a Yes, **N** indicates a No.
- **H** - Indicates whether the configuration supports the Hemisphere mode of operation. **Y** indicates a Yes, **N** indicates a No.
- **N** - Identifies the total number of DIMMs that constitute the given configuration.
- **X** – Indicates that the DIMM is populated.

Note: For detailed information and examples of RAS modes and DIMM configurations, see the QSSC-S4R Server System Technical Product Specification*.*

Installing DIMMs

Caution

- *Use extreme care when installing a DIMM. Applying too much pressure can damage the connector. DIMMs are keyed and can be inserted in only one way.*
- *Hold DIMMs only by the edges. Do not touch the components or gold edge connectors.*
- *Install DIMMs with gold-plated edge connectors only.*
- *The maximum allowable DIMM height is 3 cm; do not install DIMMs that exceed this height.*

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 51.
2. Remove the memory riser. For instructions, see “Removing a Memory Riser” on page 64.
3. Open the plastic levers on each end of the DIMM socket(s).
4. Remove the DIMM from its antistatic container. Hold the DIMM only by the edges. Do not touch the components or gold edge connectors.
5. Install DIMMs in the correct order. See “

Table 21" on page 71.

6. Position the DIMM above the socket. Align the notch on the bottom edge of the DIMM with the key in the DIMM socket.
7. Insert the bottom edge of the DIMM into the socket.
8. Push down on the top edge of the DIMM. The levers at each end of the DIMM socket close. Make sure the levers close securely.

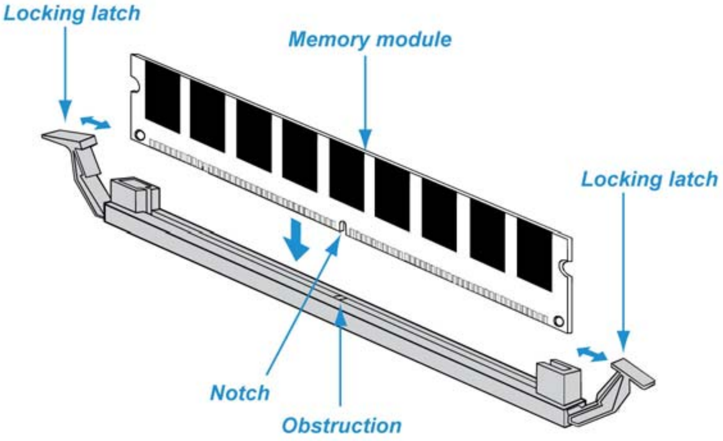


Figure 61. Install DIMMs

9. Install the memory riser. For instructions, see "Installing a Memory Riser" on page 66.

Removing DIMMs

Caution *Use extreme care when removing DIMMs. Too much pressure can damage the connector. Apply only enough pressure on the plastic levers to release the DIMM.*

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 51.
2. Remove the memory riser. For instructions, see "Removing a Memory Riser" on page 64.
3. Open the plastic levers on each end of the DIMM socket(s). The DIMM lifts from the socket.
4. Remove the DIMM holding the DIMM only by the edges. Do not touch the DIMM components or the gold edge connectors. Store it in an antistatic bag.
5. Install replacement DIMMs if necessary. For instructions, see "Installing DIMMs" on page 71.
6. Install the memory riser. For instructions, see "Installing a Memory Riser" on page 66.

Warning *Memory riser dividers must be installed at all times during operation for proper airflow.*

Chapter 5: Technician Maintenance

Note: This chapter describes procedures that require internal server access. You must be a qualified service configuration technician to perform procedures listed in this chapter. To perform these procedures power down the server and remove all power cords from the server.

Warning *All power cords must be removed from the server; otherwise the server continues to remain electrically active.*

Before You Begin

Before working with your server product, pay close attention to the "Safety and Regulatory Information" on page iii.

Tools and Supplies Needed

- Phillips (cross-head) screwdriver, #2 bit
- Phillips screwdriver, #1 bit if installing the RAID battery backup unit
- Flat-head screwdriver
- Antistatic wrist strap and conductive foam pad (recommended)

System References

Unless otherwise noted, all references to left, right, front, top, and bottom assume you are facing the front of the chassis as it would be positioned for normal operation.

System Disassembly Flow Chart

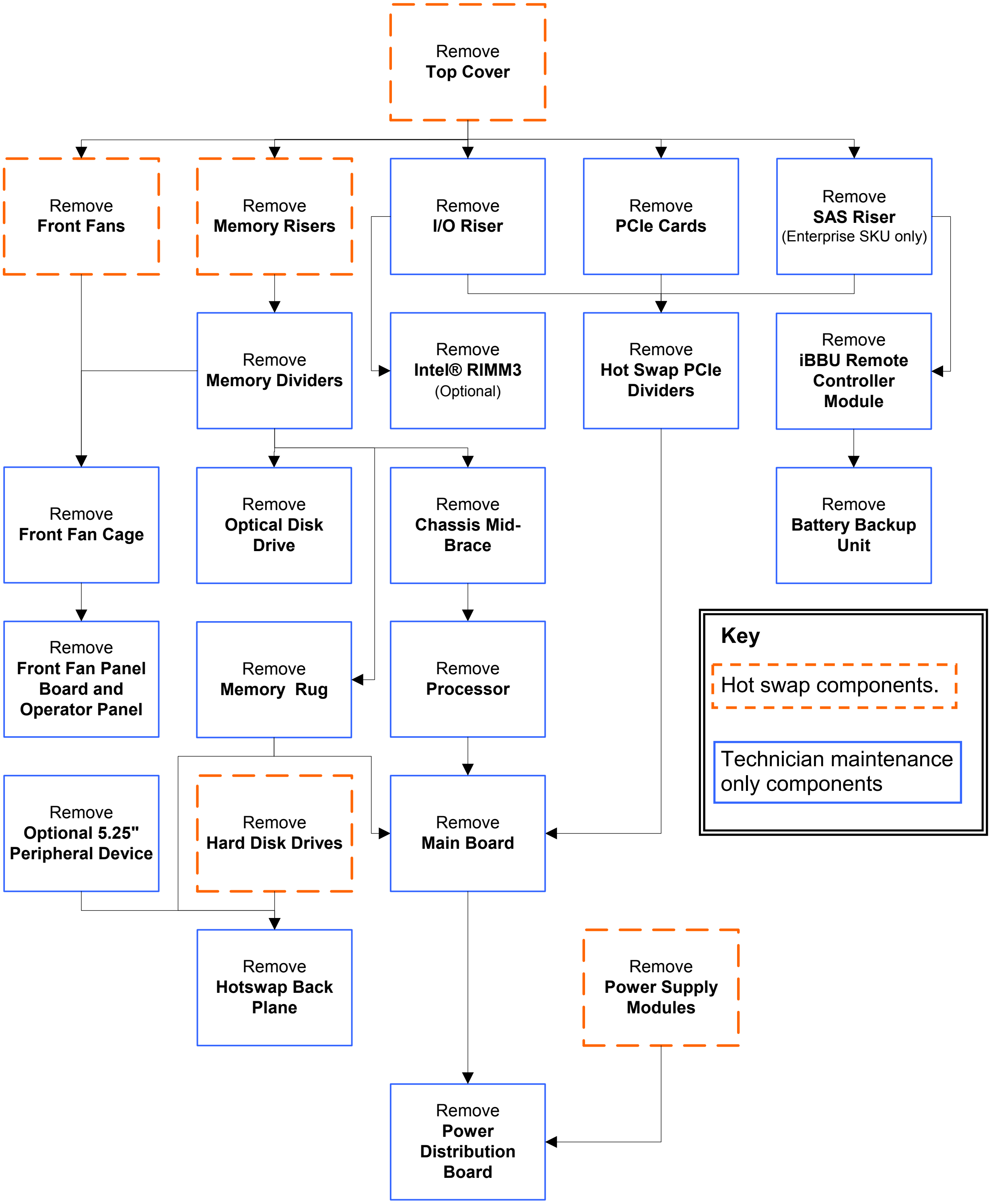

Remove Top Cover
Remove Front Fans
Remove Memory Risers
Remove I/O Riser
Remove PCIe Cards
Remove SAS Riser (Enterprise SKU only)
Remove Memory Dividers
Remove Intel® RIMM3 (Optional)
Remove Hot Swap PCIe Dividers
Remove iBBU Remote Controller Module
Remove Front Fan Cage
Remove Optical Disk Drive
Remove Chassis Mid-Brace
Remove Battery Backup Unit
Remove Front Fan Panel Board and Operator Panel
Remove Memory Rug
Remove Processor
Key
Hot swap components.
Technician maintenance only components
Remove Optional 5.25" Peripheral Device
Remove Hard Disk Drives
Remove Main Board
Remove Hotswap Back Plane
Remove Power Supply Modules
Remove Power Distribution Board

Figure 62. System Disassembly Flow Chart

Installing and Removing the Rack Rails

Rack rails are provided to allow for easy access to the top cover and internal components when the system is mounted on a rack.

Warning *It is the responsibility of the installer to ensure compliance with all applicable standards. Quanta assumes no responsibility for damage or injury due to improperly installed equipment.*

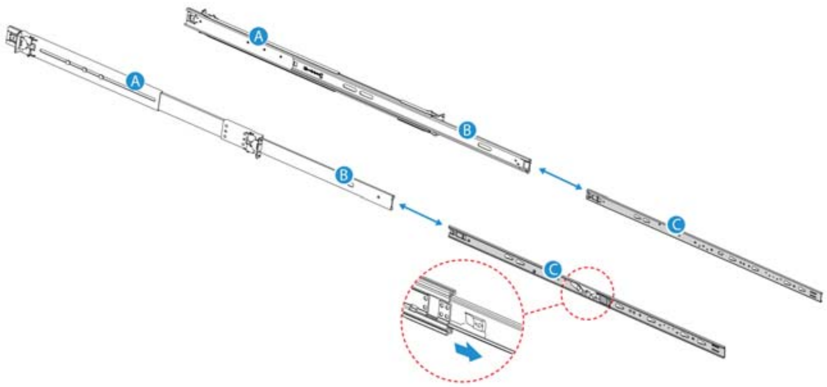
Warning *The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.*

Warning *This server requires two (2) people to physically handle the system.*

Installing the Rack Rail

When the server is to be installed into a rack, it is necessary to install two rack mount rails onto the server chassis prior to installing the server into the rack. Follow the procedures below to install your rack mount rails onto your server. Before you proceed, check the parts list for all parts.

1. Remove the inner rail from the slide rail by pressing on the latch on the inner rail and sliding the inner rail out.



Item	Description
A	Rack rail
B	Slide rail
C	Inner rail

Figure 63. Remove the Inner Rail from the Slide Rail

2. Locate and position the inner rail on the system chassis, sliding the inner rail into place.

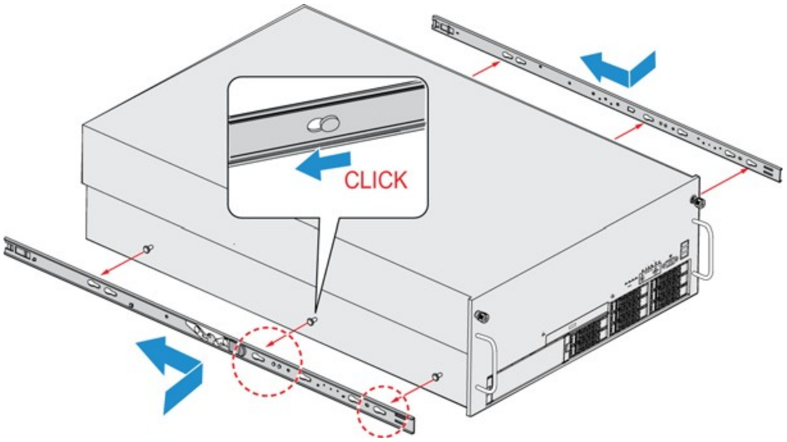


Figure 64. Installing the Inner Rail on the Server

3. Secure the rack rails in place on the rack mounting system.

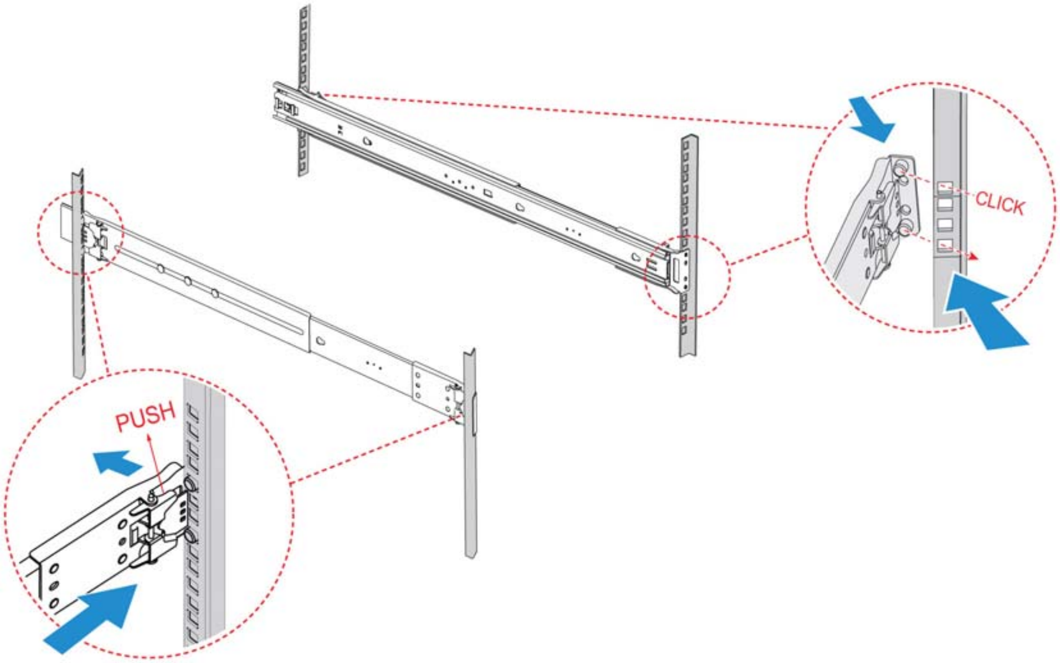


Figure 65. Installing the Slide Rails on the Rack Mounting

4. Align the slide rail with the inner rail.
5. Release the lock at the front of the inner rail and slide the server forward until flush.

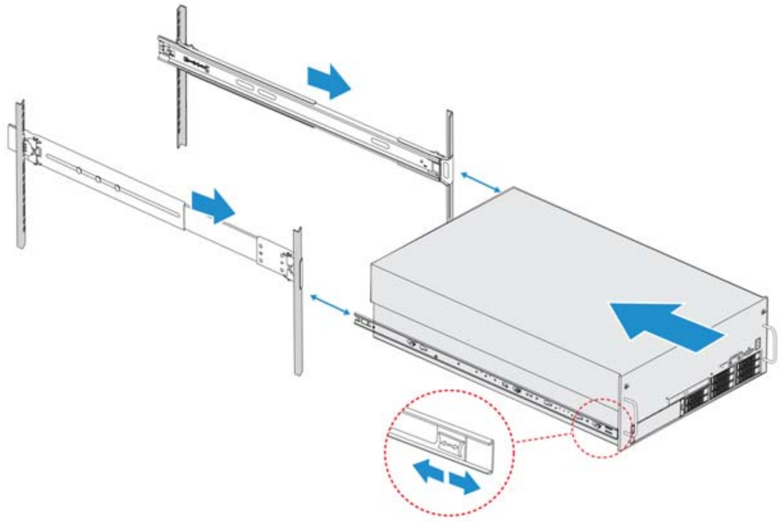


Figure 66. Installing the Server onto the Rack Mounting

6. Tighten the two (2) captive screws.

Removing the Rack Rails

When it is necessary to service the rack or remove the system from a rack mounting, remove the rack rails.

1. Press the release latch on the inner rail and remove the server system with inner rails from the rack mounting.

2. Detach the rack rails from the rack mounting system.
3. Lift the leaf lock and slide the inner rail along the server sides to lift the inner rail off.
4. Slide the inner rails back into the slide rails for storage.

Installing and Removing the Cable Management Arm (CMA)

The server chassis is designed to accommodate a Cable Management Arm (CMA) for sorting cables located at the back of the system. It is installed with the slide rails where there are inserting tabs for assembling. No tools or screws are needed.

Installing the Cable Management Arm (CMA)

1. Connect the cable management arm extension into the left outer rail

   Note: By orientation from the rear of the system this rail is on the right. This is the left rail according to the system designation of defining left and right from the front, and all descriptions follow the system designation.

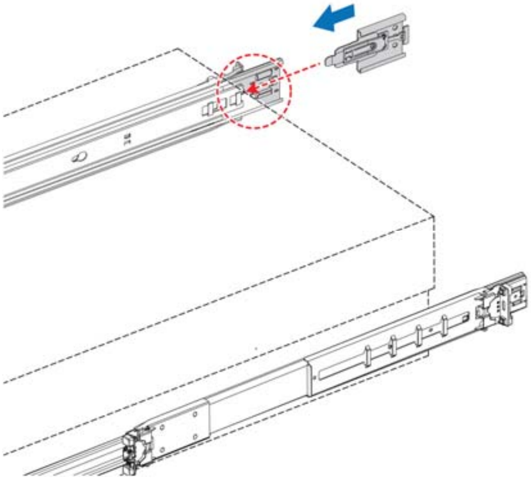


Figure 67. Installing the Cable Management Arm Extension

2. Connect the CMA connector of the inner arm of the cable management arm into the right inner slide rail (1).
3. Connect the CMA connector of the outer arm of the cable management arm into the right outer rail (2).

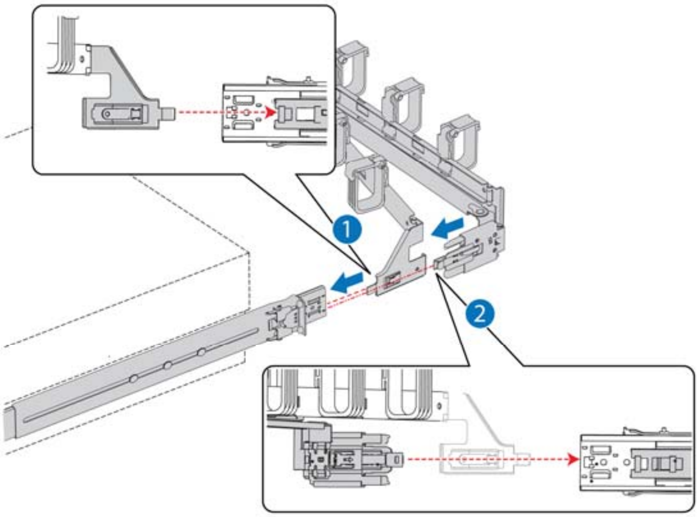


Figure 68. Installing the Inner Rail CMA connector

4. Connect the extension connector of the cable management arm into the extension placed in the left outer rail in step 1.

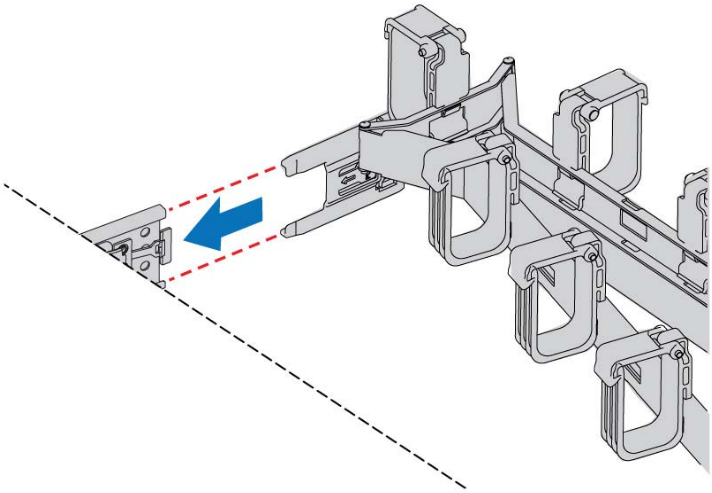


Figure 69. Installing the Cable Management Arm to the Extension

Removing the Cable Management Arm (CMA)

1. Press the latch to release and remove the cable management arm from the cable management extension on the left outer rail.

   Note: By orientation from the rear of the system this rail is on the right. This is the left rail according to the system designation of defining left and right from the front, and all descriptions follow the system designation.

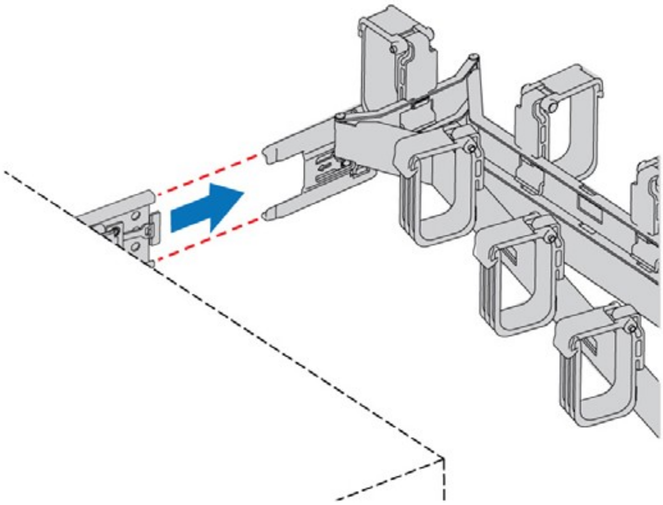


Figure 70. Removing the Cable Management Arm from the Extension

2. Press the latch to release and remove the CMA connector of the outer arm of the cable management arm from the right outer rail (1).
3. Press the latch to release and remove the CMA connector of the inner arm of the cable management arm from the right inner rail (2).

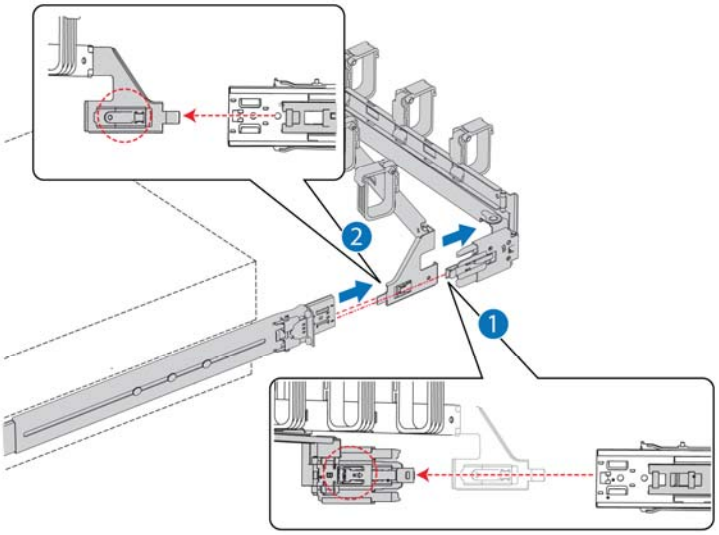


Figure 71. Removing the Inner and Outer Rail right CMA Connector

4. Press the latch and remove the cable management arm extension from the left outer rail.

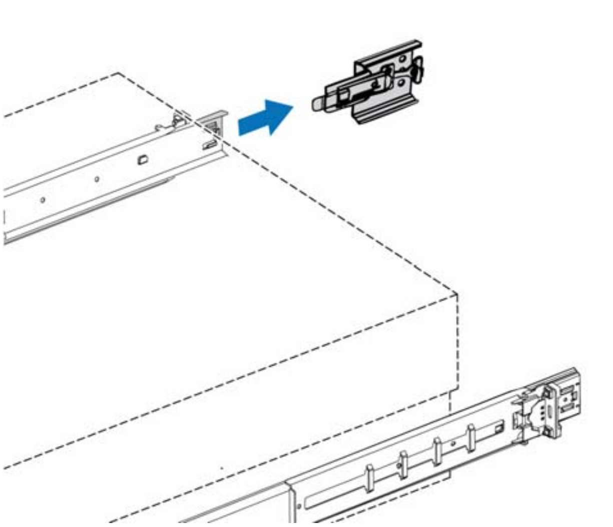


Figure 72. Removing the Cable Management Arm Extension

Removing and Installing the Top Cover

Warning *Make sure the rack is anchored securely so it does not tilt forward when the server is extended. A crush hazard exists if the rack tilts forward. This could cause serious injury.*

Caution

- *For proper cooling and airflow, do not operate the server with the cover removed. Do not leave the chassis cover open or a system fan removed any longer than necessary; system cooling could be reduced.*
- *The server comes with a removable top cover that allows the PCIe cards, memory risers, and the system fans to be hot swapped, and other system components to be serviced. Except for components described in the previous chapter, a qualified service technician must do all servicing.*
- *Provide electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components.*

Removing the Top Cover

1. No components in this chapter are hot swappable. Before removing the chassis cover:

Turn off and disconnect all peripheral devices and cables connected to the outside of the server.

Power down the system by pressing and holding the power button on the front of the chassis for several seconds.

After the server shuts down, unplug all AC power cords to remove standby power from the system.

Warning *Verify that all AC Power Cords have been removed before performing any of the procedures in this chapter.*

2. If the system is mounted in a rack, release the two rack knobs and slide it out far enough to expose the entire top cover.

3. Remove the one screw in the top cover. See letter “A” in the figure below.

4. Press down on the two latch buttons on the top cover and slide the top cover off the latches. See letter “B” in the figure below.

5. Slide the top cover toward the rear until it stops, and then lift the cover to remove it. See letter “C” in the figure.

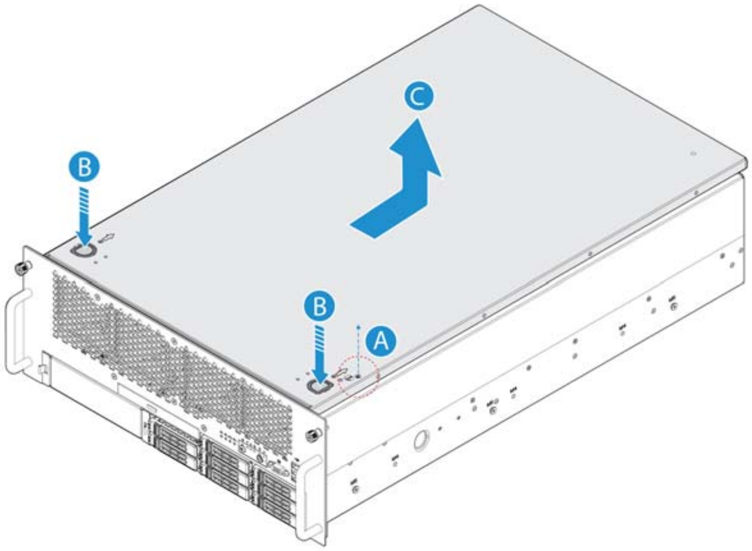


Figure 73. Removing the Chassis Cover

Installing the Top Cover

1. Place the cover over the chassis so that the side edges of the cover sit just inside the chassis sidewalls and the tabs on the cover align with the slots in the chassis.

2. Slide the cover forward until it clicks into place. See letter “A” in the figure below.

3. Replace the one screw in the top cover. See letter “B” in the figure below.

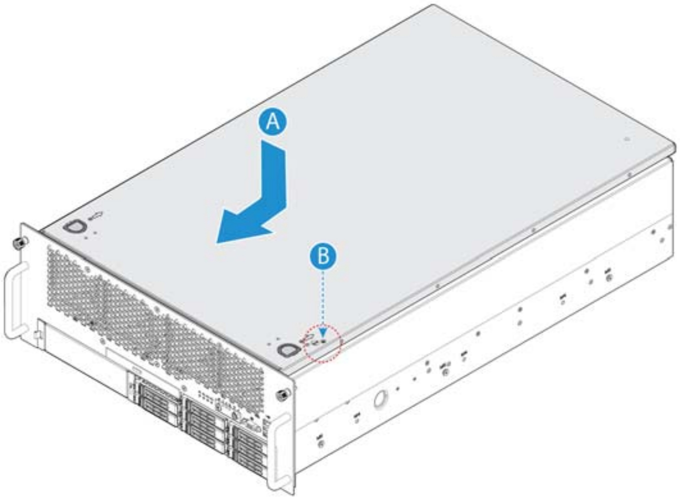


Figure 74. Installing the Chassis Cover

4. Release the locking latches on the front of the inner rails.

Warning *DO NOT release the locking latching in the middle of the inner rails. These latches release the server from the rails completely. Two people are required to physically handle this server. Serious hazard warning.*

5. Slide the system back into the rack.

6. Secure the two rack knobs.

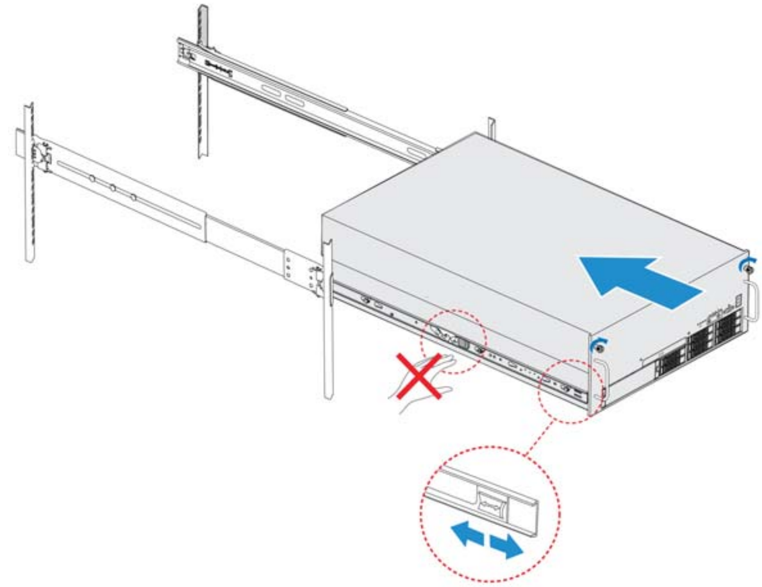


Figure 75. Replacing the Server

7. Reconnect all peripheral devices and the AC power cords.

Installing and Removing Non-Hot Swap PCI Express Add-in Cards

Removing a Non-Hot Swap PCIe Card

PCIe cards in slots 1, 2, 6 and 7 can be hot swapped. If you want to hot swap a card in one of these slots, see "Removing and Installing Hot Swap PCI Express Add-in Cards" on page 58.

Caution *AC power must be removed from the system before servicing a non-hot swap PCIe card. You might damage your system if you do not power it down before removing or installing a card in slots 3 through 5 and 8 through 10.*

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 51.
2. Disconnect any cables attached to the PCIe card.
3. Rotate the retention latch into the up position.
4. Pull up on the card to remove it.

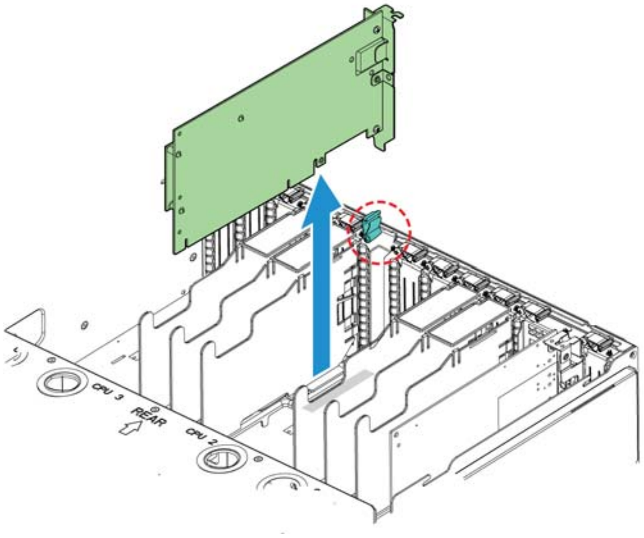


Figure 76. Removing a non- hot swap PCIe Card

5. Place the PCIe card on a clean, static-free work surface or inside a static-free plastic bag.
6. To install a replacement PCIe card, see "Installing a Hot Swap PCIe Card", below. Otherwise, install a PCIe expansion slot cover.
7. Install the top cover. For instructions, see "Installing the Top Cover" on page 52.

Installing a Non-Hot Swap PCIe Card

PCIe cards in slots 1, 2, 6 and 7 can be hot swapped. If you want to hot swap a card in one of these slots, see "Removing and Installing Hot Swap PCI Express Add-in Cards" on page 58.

Caution *AC power must be removed from the system before servicing a non-hot swap PCIe card. You might damage your system if you do not power it down before removing or installing a card in slots 3 through 5 and 8 through 10.*

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 51.
2. Being careful not to touch the components or the gold edge connectors on the PCIe card, remove it from its protective wrapper. Place the card component-side up on a clean, static-free work surface.
3. Rotate the retention latch into the up position.

4. If necessary, remove the expansion slot cover in the slot you are using by sliding it up from inside the chassis.

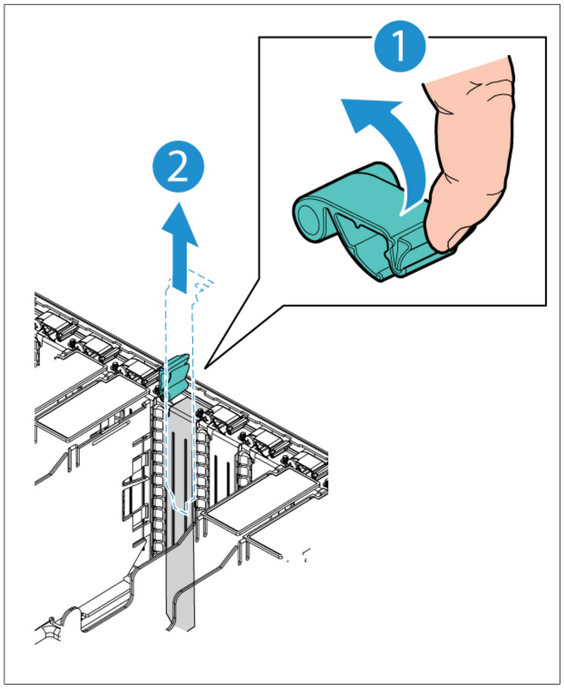


Figure 77. Removing a PCIe expansion slot cover

5. Align and slide the adapter board down until it seats in its connector.

6. Press the card down firmly until it seats into the slot.

7. Rotate the retention latch at the rear of the card slot into the down position.

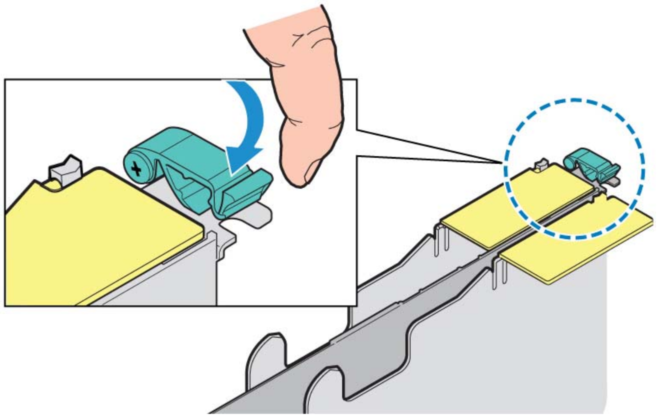


Figure 78. Installing a non- hot swap PCIe Card

8. Attach any required cables to the PCIe card.

9. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Installing and Removing the SAS Riser

The SAS riser is installed at the SAS riser slot.

Removing the SAS Riser

Caution: Before removing any hard drives, note their locations. Hard drives must be reinstalled in their original positions. Failure to reinstall the drives in the correct locations may result in a loss of data.

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82.
2. Disconnect the two mini-SAS cables connecting the SAS Riser to the backplane.

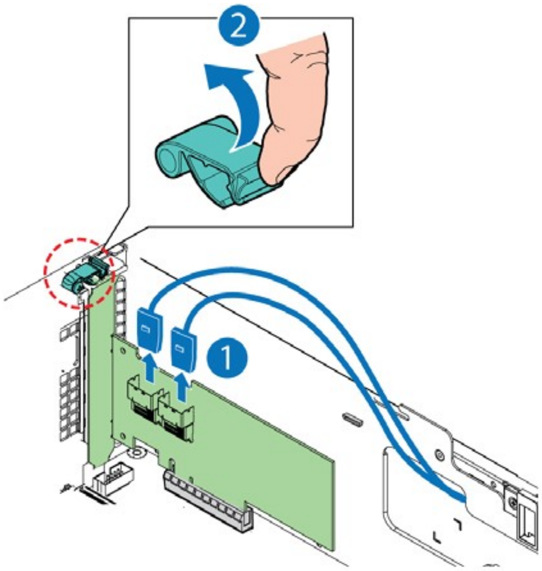


Figure 79. Removing mini-SAS cables

3. Rotate the retention latch into the up position.
4. Carefully lift the card up out of its slot.

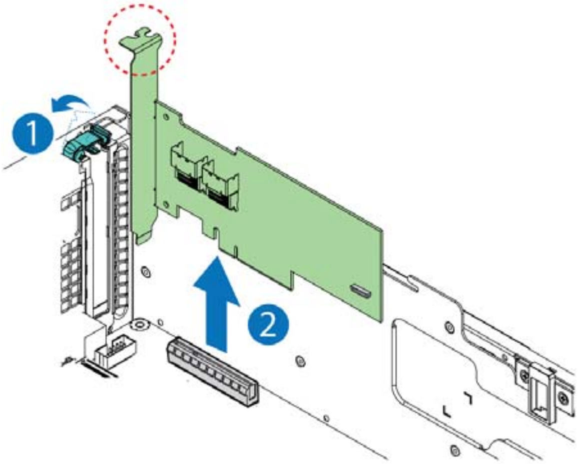


Figure 80. Removing SAS Riser

5. Install an expansion slot cover by sliding it down to cover the opening.
6. Rotate the retention latch into the down position.
7. Install the top cover. For instructions, see "Installing the Top Cover" on page 52.

Installing the SAS Riser

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Being careful not to touch the components or connectors on the riser card, remove the card from the anti-static bag and place it on a clean, ESD-protected work surface.
3. Rotate the retention latch into the up position.
4. If an expansion slot cover is installed, remove it by sliding it up.
5. Press the card down into the riser slot until it seats firmly in place.
6. Rotate the retention latch into the down position.

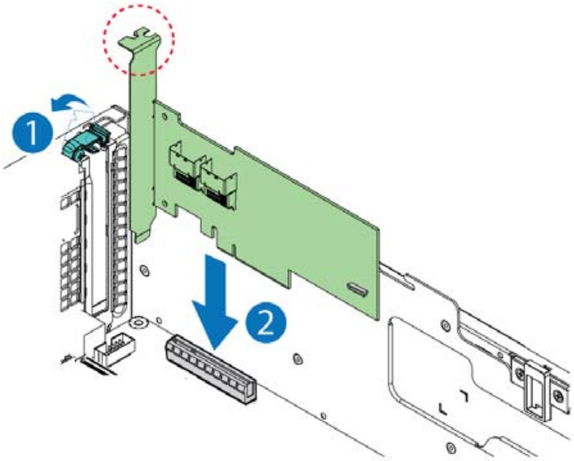


Figure 81. Installing the SAS Riser

7. Connect the two mini-SAS cables connecting the SAS Riser to the backplane.

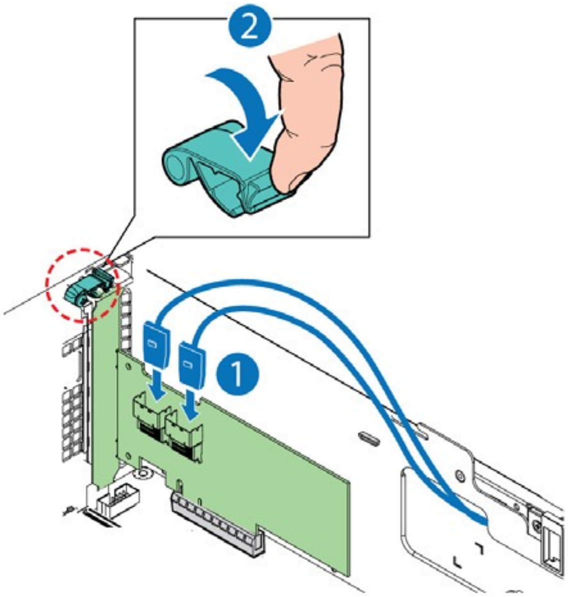


Figure 82. Connecting the mini-SAS cables

8. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Installing and Removing the iBBU 07 (Intelligent Battery Backup Unit)

The iBBU07 is a battery-backup unit that protects the integrity of the cached data on the SAS controller by providing backup power if there is a complete AC power failure or a brief power outage. The iBBU battery must be purchased separately from the installation kit that contains these components:

- One iBBU power cable
- One iBBU remote converter module

The BBU holder is accompanied with the system.

Installing the iBBU 07 (intelligent Battery Backup Unit)

1. Locate the BBU location, see the following images. The BBU Holder is pre-installed in the system at the location closer to Memory Riser# 1. A second BBU location is as the second image shown, closer to Memory Riser#8 used for external JBOD support.

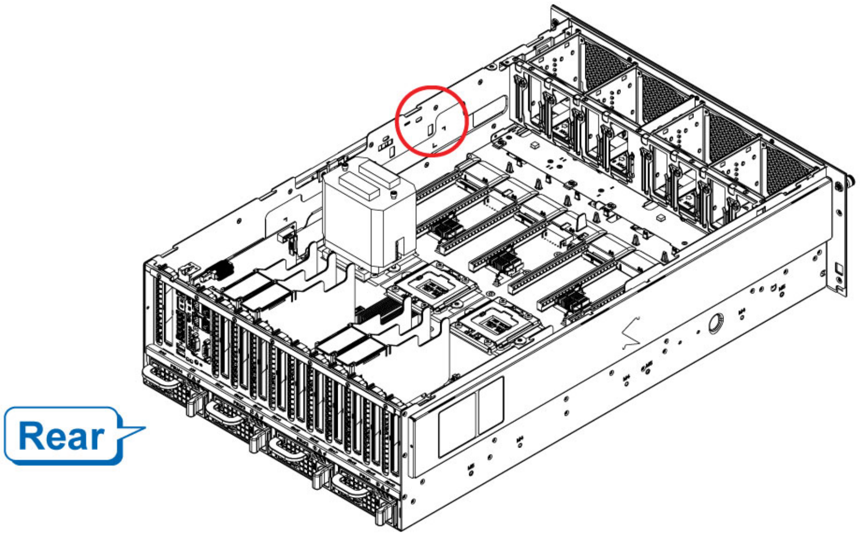


Figure 83. View of BBU location # 1, closer to Memory Riser #1

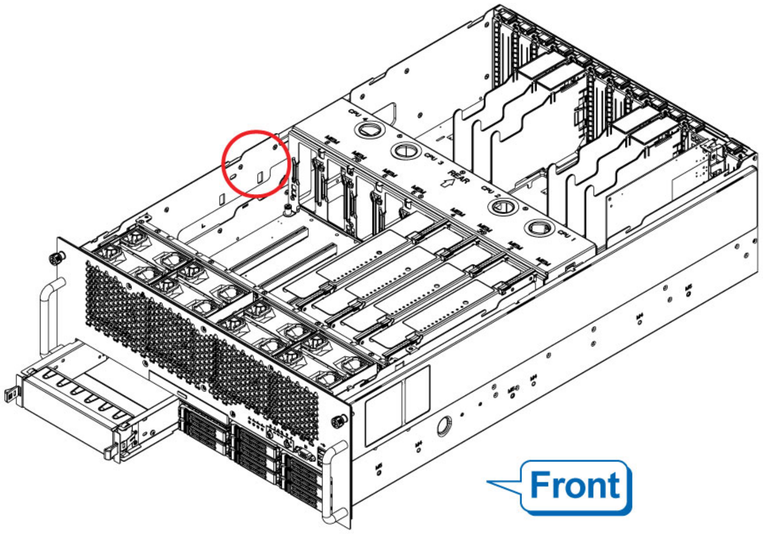


Figure 84. View of BBU location # 2, closer to Memory Riser # 8

2. Remove memory riser (“either memory riser# 1 or # 8”) and pertinent memory dividers and risers to provide clear access to the iBBU bracket mounted on the server chassis right wall.
   See “Figure 6. Memory Riser Locations and Numeration” on page 8 for the location of the riser. The riser number is also etched on the chassis mid-brace. For instructions on removing a memory riser see “Removing a Memory Riser” on page 64. For instructions on removing a memory divider see “Removing the Memory Dividers” on page 95.

3. Remove the iBBU battery holder from the chassis (“2”).

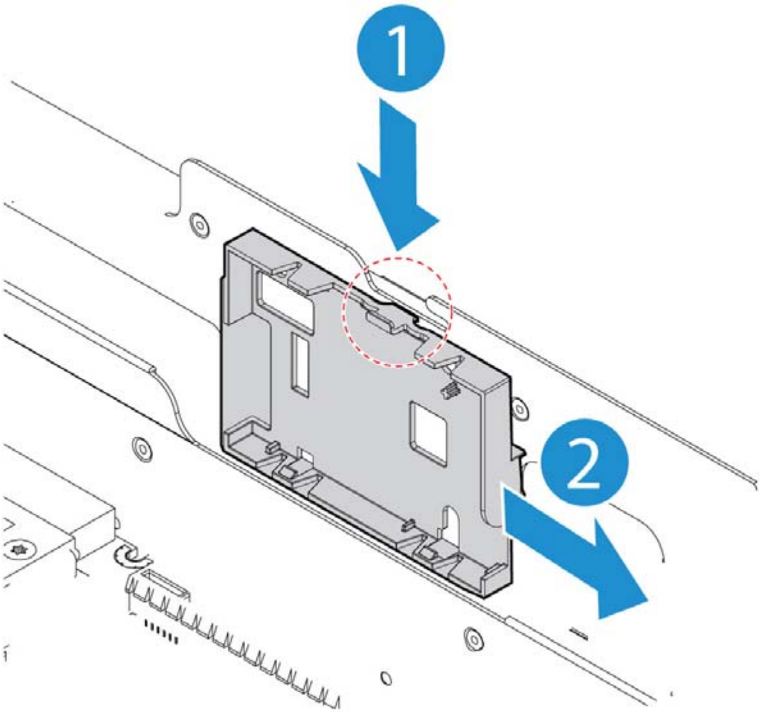


Figure 85. Removing the iBBU Battery Holder

4. Install the iBBU battery into the holder.

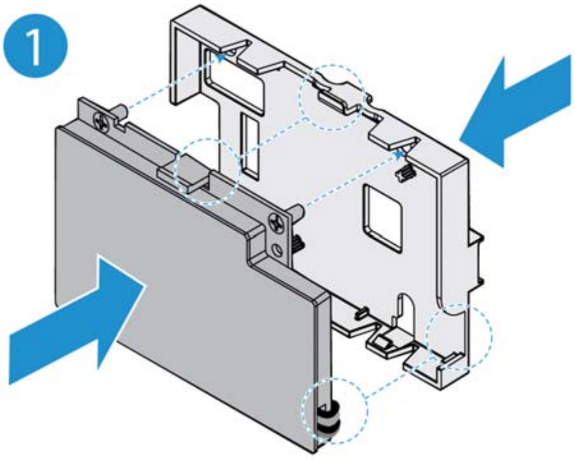


Figure 86. Installing the IBBU into the holder

5. Connect the iBBU power cable to the battery.

6. Attach the iBBU holder to the chassis side: align the tabs on the holder with the rectangular holes in the chassis interior.

7. Connect the iBBU power cable to the iBBU converter module.
8. Connect the iBBU converter module to the SAS riser as shown in the figure below.

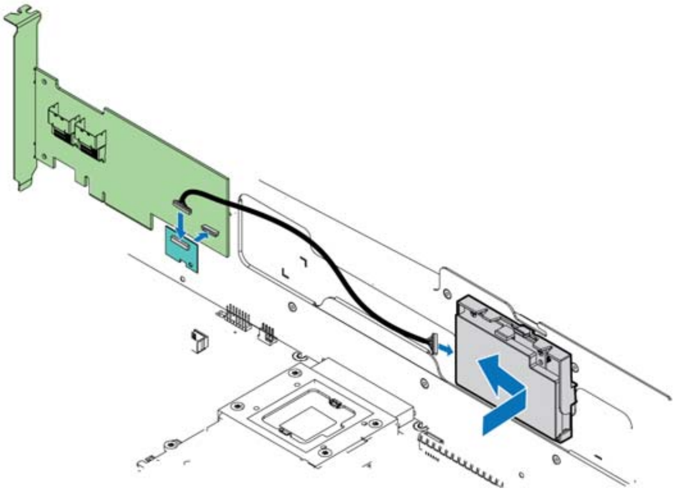


Figure 87. Installing the iBBU 07 Holder

Removing the iBBU 07 (intelligent Battery Backup Unit)

1. Remove the iBBU converter module from the SAS riser as shown in the figure below.
2. Remove the iBBU power cable from the iBBU converter module.
3. Remove the iBBU holder from the chassis side.

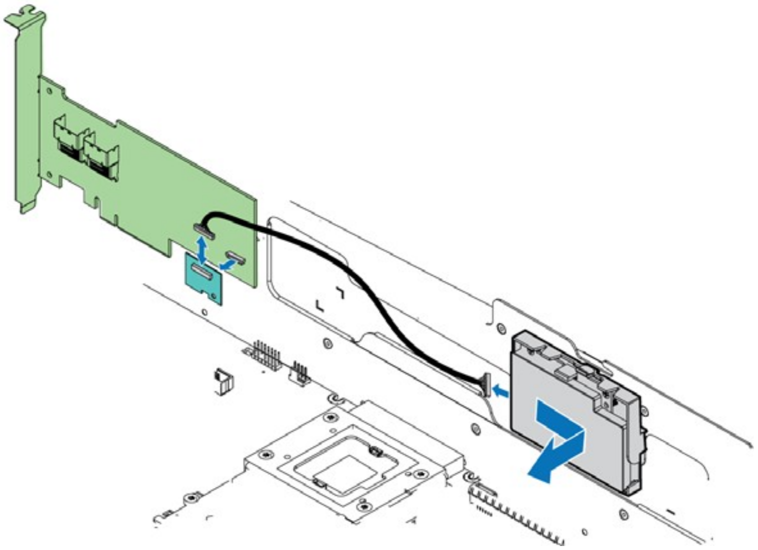


Figure 88. Removing the iBBU holder from the chassis

4. Remove the iBBU power cable from the battery.
5. Remove the iBBU battery from the holder.

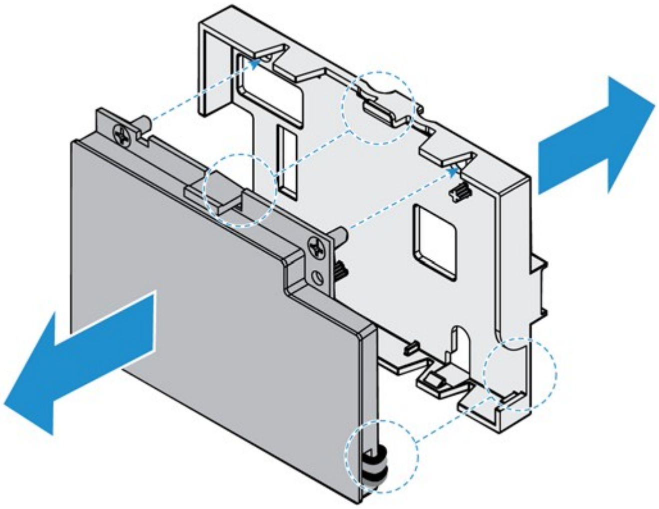


Figure 89. Removing the iBBU 07 Holder

6. Install the empty iBBU battery holder into the system chassis right wall.

Installing and Removing the I/O Riser

Installing the I/O Riser

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Being careful not to touch the components or connectors on the I/O riser card, remove the card from the anti-static bag and place it on a clean, ESD-protected work surface.
3. Optional: Install the Intel® Remote Management Module 3 (RMM3) onto the I/O riser. For instructions, see “Installing the RMM 3” on page 93.
4. Rotate the retention latch into the up position.
5. Press the card down in to the riser slot until it is firmly seated. See “1” in the following figure.
6. Rotate the retention latch into the down position. See “2” in the following figure.

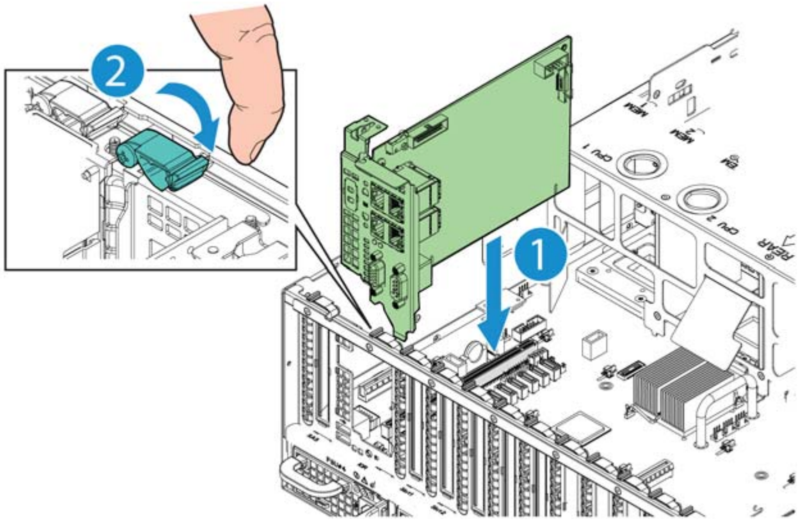


Figure 90: Removing the I/O Riser

7. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Removing the I/O Riser

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Optional: Remove the Intel® Remote Management Module 3 (RMM3) from the I/O riser if it is installed. For instructions, see “Removing the Intel®RMM3” on page 94.
3. Rotate the retention latch into the up position. See “1” in the following figure.
4. Carefully lift the I/O riser card out of the slot. See “2” in the following figure.

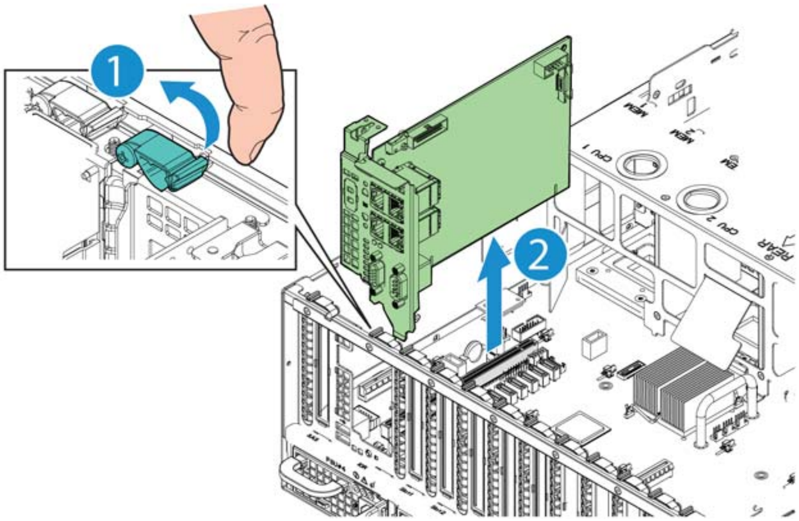


Figure 91: Removing the I/O Riser

5. Install the replacement I/O Riser.
6. Rotate the retention latch into the down position.
7. Press the card down firmly until it is securely seated in the slot.
8. Install the top cover. For instructions, see “Installing the Top Cover” on page 52.

Installing and Removing the Intel® Remote Management Module 3 (RMM3)

The optional Intel®RMM3 comes as a kit with these contents:

- One Intel® Remote Management Module 3
- One plastic bag of screws, a slot bracket and cabling

Installing the RMM 3

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove the I/O riser card. For instructions, see “Removing the I/O Riser” on page 92.
3. Set the I/O riser card on a static-controlled surface with the components facing up.
4. Attach the bracket to the RMM3 with the screws provided.
5. Write down the MAC address on the Intel®RMM3. It is on a label attached to the Intel®RMM3. If you do not write down the MAC address before installing the Intel®RMM3, you will need to open the system later to record this information before you can configure the Intel®RMM3.
6. Screw the RMM3 module into the steel I/O Riser end plate as shown.

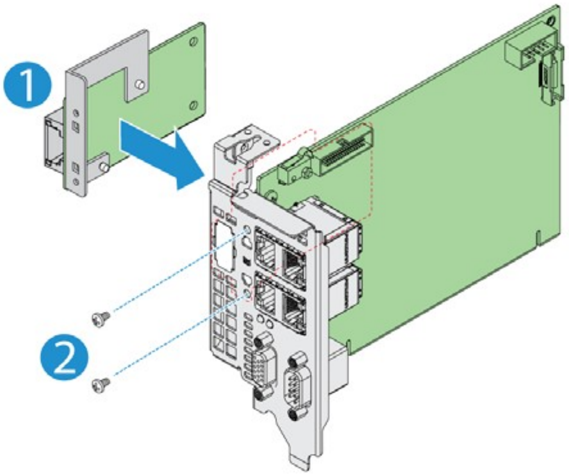


Figure 92. Connecting the RMM3 to the I/O Riser end plate

7. Connect one end of the ribbon cable to the J1M1 header on the RMM3 card.
8. Connect the other end of the ribbon cable to header J2A1 on the I/O riser.

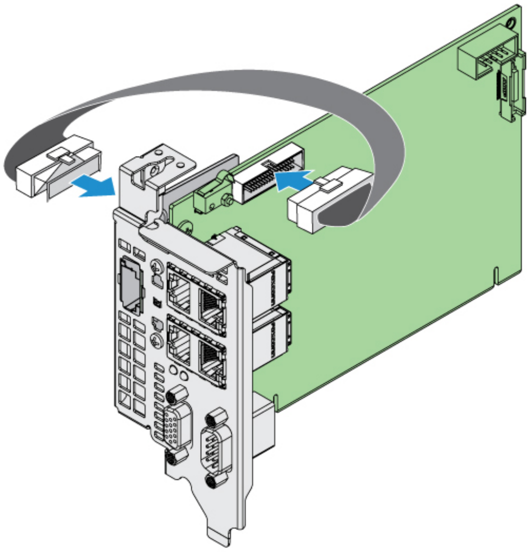


Figure 93. Installing the Intel®RMM3

9. Install the I/O riser. For instructions, see "Installing the I/O Riser" on page 92.
10. Install the top cover. For instructions, see "Installing the Top Cover" on page 83.

Removing the Intel®RMM3

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82.
2. Remove the I/O riser card. For instructions, see "Removing the I/O Riser" on page 92.
3. Set the I/O riser card on a static-controlled surface with the components facing up.
4. Disconnect the ribbon cable from the Intel®RMM3 card and the I/O Riser.
5. Unscrew the RMM3 from the steel I/O Riser end plate.
6. Install the I/O riser. For instructions, see Installing the I/O Riser" on page 92.
7. Replace the top cover. For instructions, see "Installing the Top Cover" on page 83.

Removing and Installing the Memory Dividers

The memory dividers direct airflow from the front fans to the processors. There are eight dividers in total.

Removing the Memory Dividers

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Lift the memory divider out of the system.

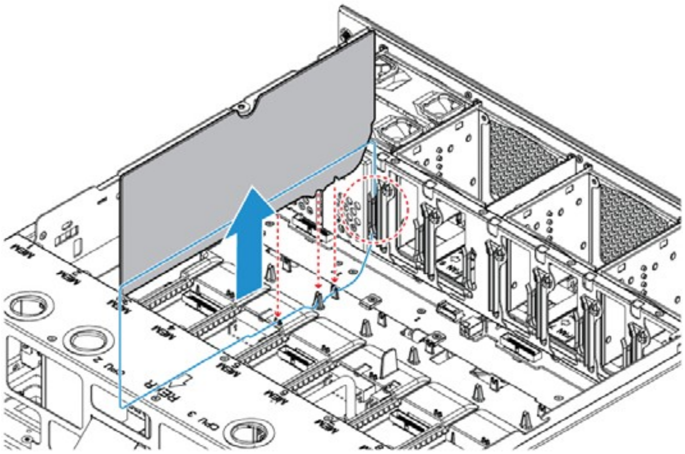


Figure 94. Removing the Memory Dividers

3. Replace the top cover. For instructions, see “Installing the Top Cover” on page 83.

Installing the Memory Dividers

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Place the memory dividers into the system correctly positioned on the memory rug support below.

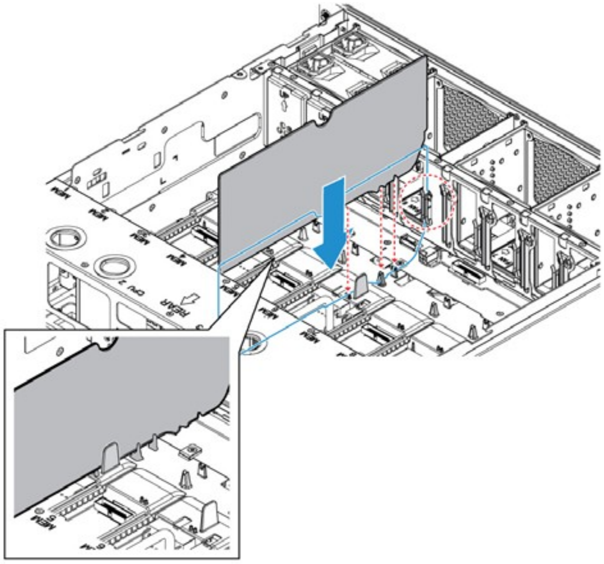


Figure 95. Installing the Memory Dividers

Note: Be careful to slide the memory dividers down the correct metal retention guides, not the plastic retention guides of the memory risers.

3. Replace the top cover. For instructions, see “Installing the Top Cover” on page 83.

Removing and Installing the Optical Disk Drive

The server system accommodates one optical drive. The device is not hot swappable, so the system must be powered down and the power cords removed from the chassis before installing or removing this drive.

> *Note: Value SKU systems use the 6 Mainboard SATA connectors for the HSBP. You will need to disconnect a SATA cable from a hard drive bay on the HSBP and connect it to connector 8 on the HSBP to be able to use an Optical Disk Drive. The hard drive bay corresponding to the removed SATA cable will no longer be available.*

Removing an Optical Disk Drive

1. Remove memory riser No. 5. For the location of memory riser No. 5 see “Figure 6. Memory Riser Locations and Numeration” on page 8; the memory riser number is also stamped into the chassis mid-brace. For instructions on removal see “Removing a Memory Riser” on page 64.
2. Remove the memory dividers next to memory riser No. 5. For instructions see “Removing the Memory Dividers” on page 95.
3. Move the FFC cable on the memory rug to one side to clear the ODD release latch. See “1” in the following figure.
4. Lift and push the ODD release latch. See “2” in the following figure.

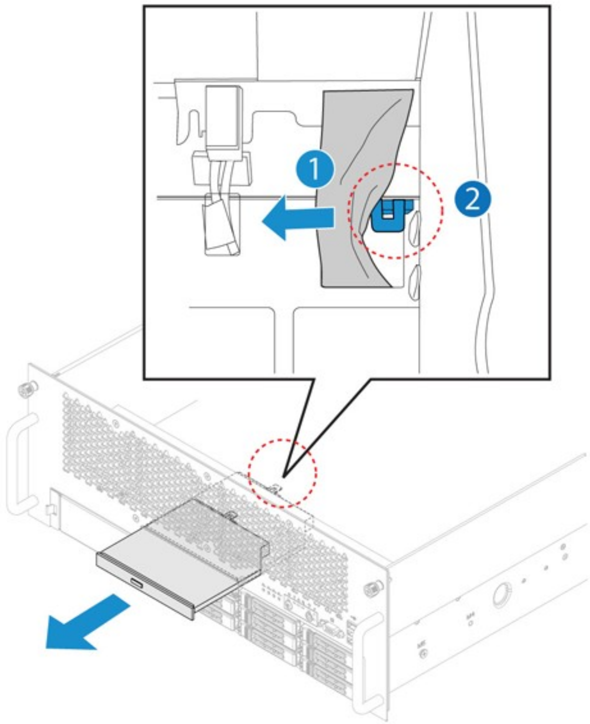


Figure 96. Removing the Optical Disk Drive from the Server

5. Slide the DVD-RW from the front opening in the faceplate of the system.
6. Remove the securing bracket from the back of the Optical Disk Drive.

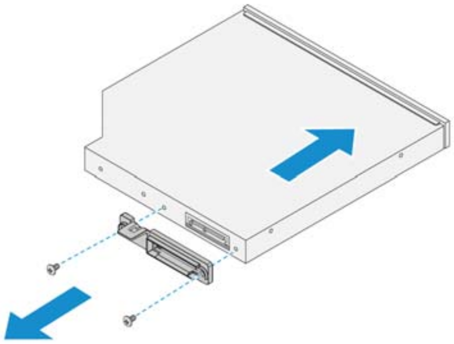


Figure 97. Removing the securing bracket from the Optical Disk Drive

7. Remove the DVD_RW from the carrier. Store the drive in an antistatic protective wrapper or in its original packaging.
8. Install a new DVD-RW drive into the carrier or install the ½" SATA DVD Blank (Value SKU only) and slide the empty carrier into the server. See "Installing an Optical Disk Drive" below.

Installing an Optical Disk Drive

1. Remove the optical disk drive or ½" SATA DVD Blank (Value SKU Only). For instructions, see "Removing an Optical Disk Drive" on page 96.
2. Remove the new drive from its protective wrapper, and place it component-side down on a clean ESD-protected work surface.
3. Attach the securing bracket to the DVD-RW drive.

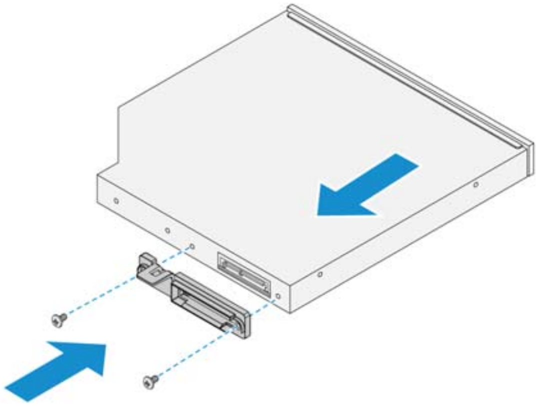


Figure 98. Assembling the Optical Disk Drive and Carrier

4. Place the left side of the drive into the drive carrier.
5. Press the DVD-RW drive into the carrier until it is firmly secured.
6. Insert the DVD-RW drive carrier assembly into the front opening in the chassis until flush with the faceplate.

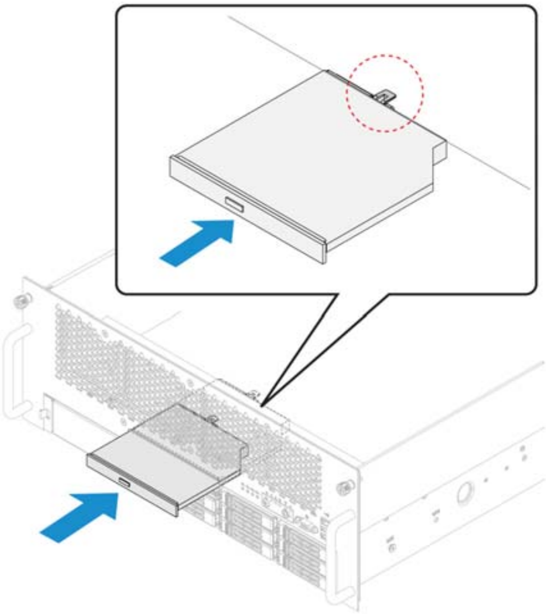


Figure 99. Inserting the Optical Disk Drive into the System

Removing and Installing the Chassis Mid-Brace

Removing the Chassis Mid-Brace

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82.
2. Remove the memory risers. For instructions, see "Removing a Memory Riser" on page 64.
3. Remove the memory dividers. For instructions, see "Removing the Memory Dividers" on page 95.
4. Loosen the six captive screws.
5. Lift the chassis mid-brace out of the system.

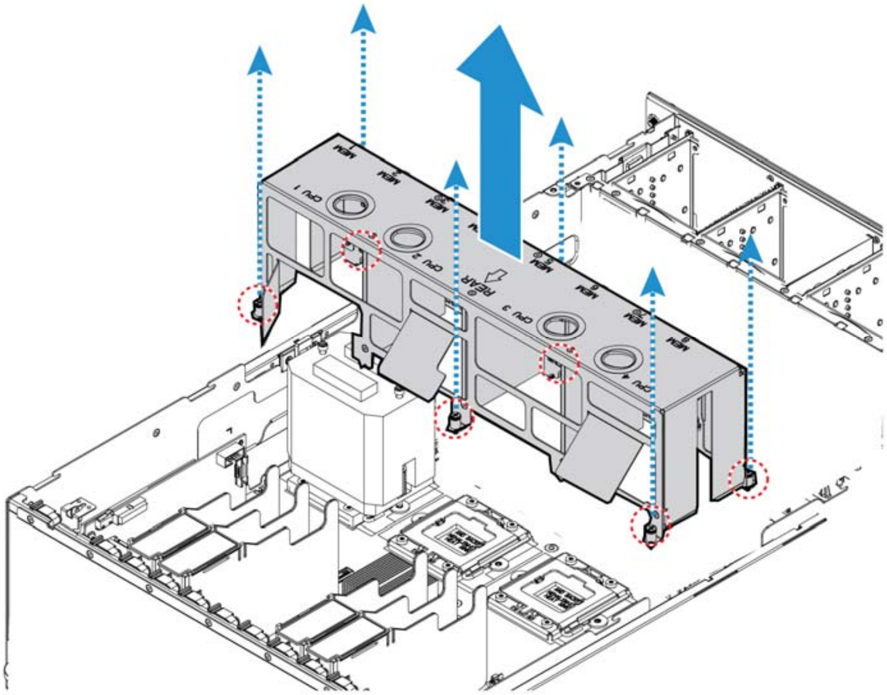


Figure 100. Removing the Chassis Mid-Brace

6. Replace the top cover. For instructions, see “Installing the Top Cover” on page 83.

Installing the Chassis Mid-Brace

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove the memory risers. For instructions, see “Removing a Memory Riser” on page 64.
3. Place the chassis mid-brace into position
4. Tighten the six captive screws.

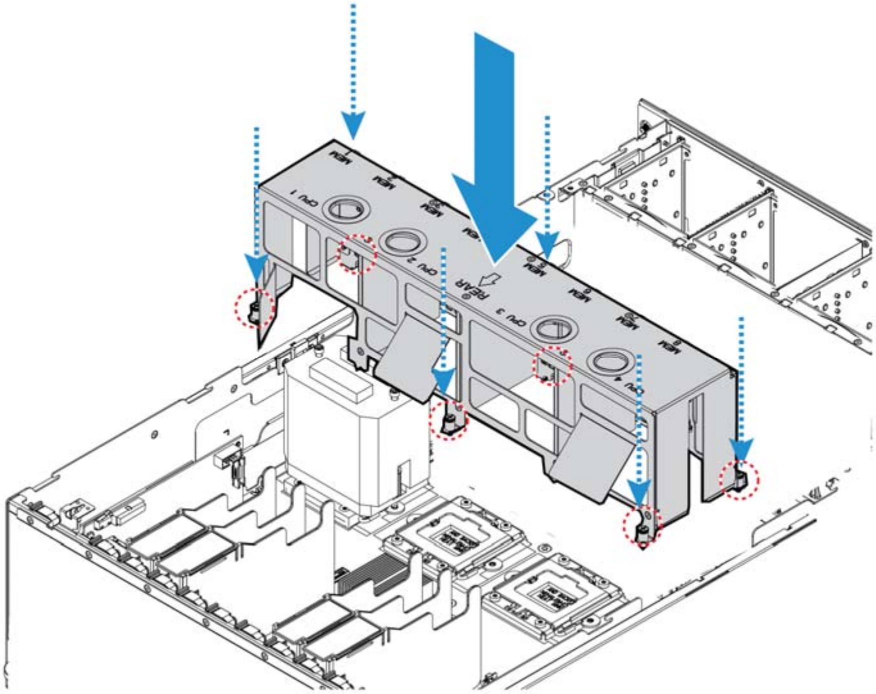


Figure 101. Installing the Chassis Mid-Brace

5. Replace the memory dividers. For instructions, see "Installing the Memory Dividers" on page 95.
6. Replace the memory risers. For instructions, see "Installing a Memory Riser" on page 66.
7. Replace the top cover. For instructions, see "Installing the Top Cover" on page 83.

Servicing the Processors

The server system requires at least one Intel® Xeon® Processor 7500 Series. Follow these rules:

- Each processor socket must be empty or include both a processor and heat sink.
- Processors must be installed in order, beginning with the CPU 1 socket, followed by the CPU 2 socket, and so on. See

Table 21 on page 71 for details.

If you need to replace a processor:

1. Read the information about “Handling the Intel® Xeon® Processor 7500 Series ”, below.
2. Follow the instructions for “Removing a Processor” on page 105.
3. Follow the instructions for “Installing a Processor” on page 101.

If you are adding an additional processor:

4. Read the information on “Handling the Intel® Xeon® Processor 7500 Series ”, below.
5. Follow the instructions on “Installing a Processor” on page 101.

If you are removing a processor, but not installing a replacement processor:

6. Read the information on “Handling the Intel® Xeon® Processor 7500 Series ”, below.
7. Follow the instructions for Removing a Processor” on page 105.

Handling the Intel® Xeon® Processor 7500 Series

The Intel® Xeon® Processor 7500 Series require special handling procedures:

- Observe the safety precautions, warnings, and cautions described in “Safety and Regulatory Information” on page iii.
- Ground yourself with a grounding heel or wrist strap, and an antistatic smock.
- Remove processors from the packaging at a clean ESD-protected work surface.
- When removing processors from the packaging, keep the package flat on the surface while you open it so that no processors fall from the packaging.
- Hold processors by their sides with the pins facing down.
- To avoid mechanical and / or ESD damage, do not touch the cartridge pin array or PCB components.
- When placing processors on the clean ESD-protected work surface, place them with their pins facing down. Do not stack processors on top of each other.

Installing and Removing a Processor

Installing a Processor

Caution *Failure to correctly apply thermal grease between a processor and the heat sink could cause damage to the server.*

Caution *Using a processor heat sink that is not expressly designed for the S4R is not supported and may result in processor thermal issues.*

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove the memory riser dividers. For instructions, see “Removing the Memory Dividers” on page 95.
3. Remove the chassis mid-brace. For instructions, see “Removing the Chassis Mid-Brace” on page 98.
4. Open the processor release lever. See the following figure.

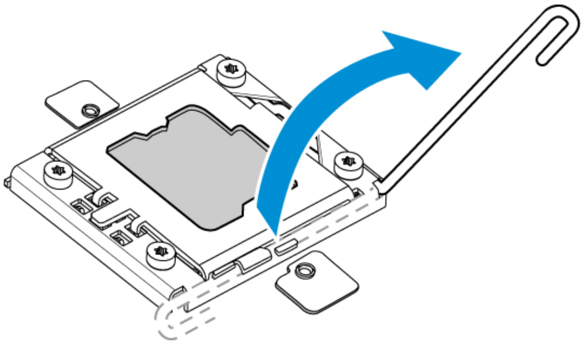


Figure 102. Open Processor Socket Release Lever

5. Open the processor door (A) and remove the protective cover (B) as shown in Figure 103.

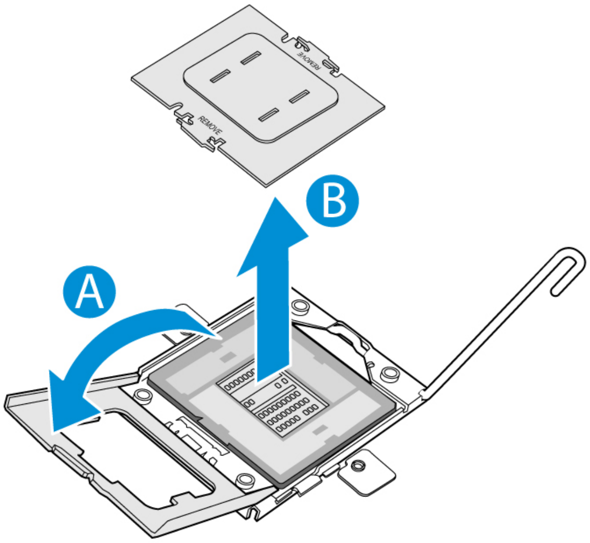


Figure 103. Open socket door and remove protective cover

6. Position the processor over the socket, matching the two triangles and lining up the processor pins with the socket.

Warning *Do not apply force. If the processor does not fit easily in the socket, check and correct the positioning.*

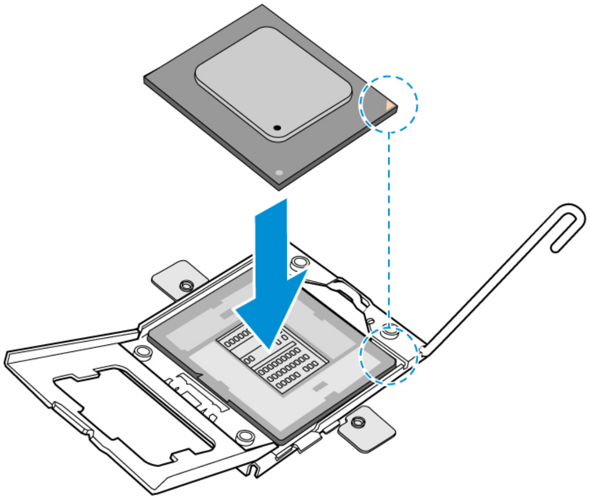


Figure 104. Set Processor into Socket

7. Close the ZIFF door and lever as shown in the following figure.

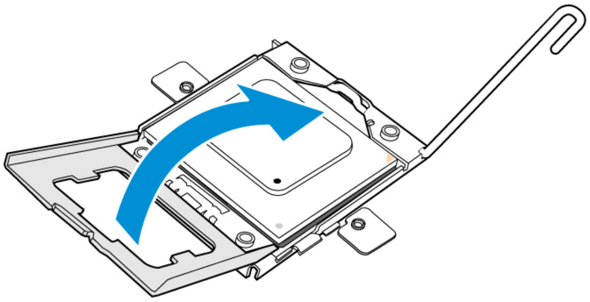


Figure 105. Close Processor Socket Lever

8. Remove the heatsink thermal interface material (TIM) cover from the heatsink.
9. Set the heat sink on the processor, visually aligning the two screws in the heat sink with the screw holes in the main board.
10. Use a long Phillips screwdriver to turn each screw 2-3 full turns. Continue to tighten the screws approximately one full turn at a time.
11. Apply final torque on the first screw until full torque of 8 inch-pounds is achieved. Repeat for the second screw.

    Note: Recommended Torque value: 8 inch pounds.

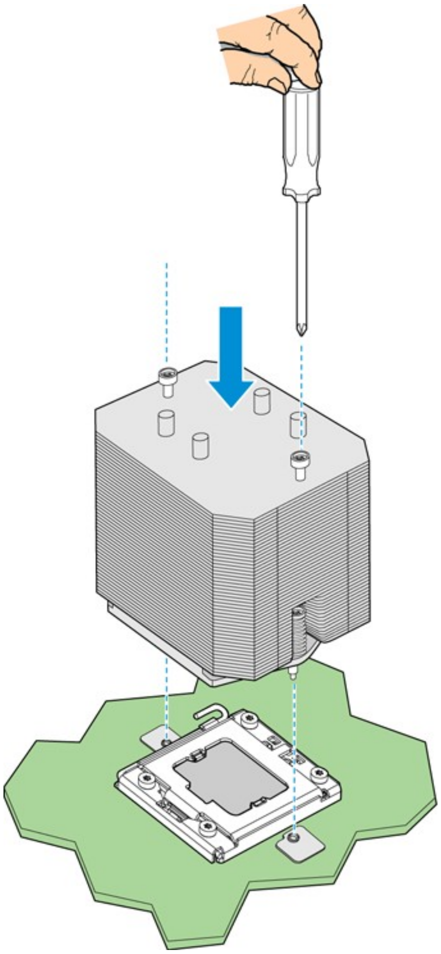


Figure 106. Installing the heat sink

12. Replace the chassis mid-brace. For instructions, see “Installing the Chassis Mid-Brace” page 99.

Removing a Processor

Note: To aid in separating the heat sink from the processor, power on the server for a few minutes. This warms the thermal grease and prevents the processor from pulling out of the closed socket. Make sure the heat sink is cool to the touch before removing.

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82.
2. Remove the chassis mid-brace. For instructions, see "Removing the Chassis Mid-Brace" on page 98.
3. Use a long Phillips head screwdriver to loosen the four screws on the corners of the heat sink.
4. Gently rock the heat sink back and forth to break the seal between the heat sink and the processor.
5. Lift the heat sink from the processor.
6. Lift the release lever on the processor socket. See the following figure.

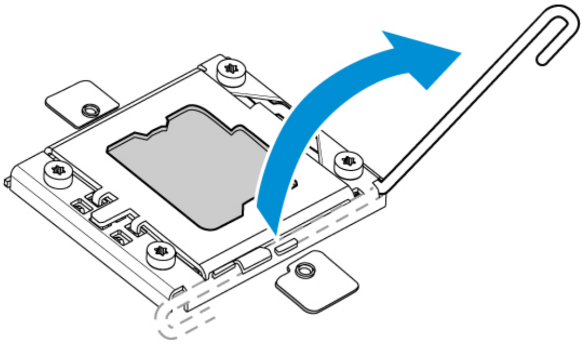


Figure 107. Open Processor Socket Release Lever

7. Open the processor socket door.
8. Remove the processor from the chassis. Store it in an anti-static bag or in the original packaging.
9. Install a replacement processor. For instructions, see "Installing a Processor" on page 101.
10. Install the chassis mid-brace. For instructions, see "Installing the Chassis Mid-Brace" on page 99.
11. Install the top cover. For instructions, see "Installing the Top Cover" on page 83.

Note: Once the processor is removed, note that the release mechanism shows the socket is open.

Removing and Installing the Memory Rug

The memory rug directs the air from the front fans over the mainboard to the processors. Do not attempt to operate the system without the memory rug in place or if it is damaged.

Removing the Memory Rug

1. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82
2. Remove the memory risers. For instructions, see "Removing a Memory Riser" on page 64.
3. Remove the memory dividers. For instructions, see "Removing the Memory Dividers" on page 95.
4. Loosen the four (4) captive screws. See "1" in the figure below.
5. Lift the memory rug out of the system. See "2" in the figure below.

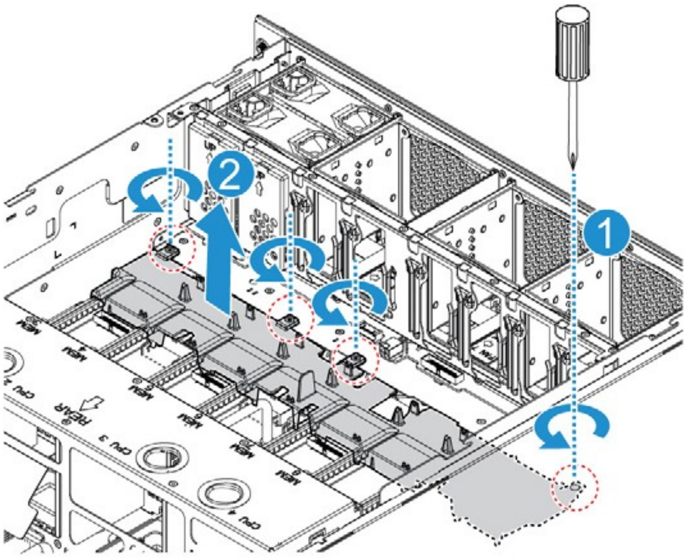


Figure 108. Removing the memory rug

Installing the Memory Rug

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove the memory risers. For instructions, see “Removing a Memory Riser” on page 64.
3. Remove the memory dividers. For instructions, see “Removing the Memory Dividers” on page 95.
4. Place the memory rug in the system. See “1” in the following figure.
5. Tighten the four (4) captive screws. See “2” in the following figure.

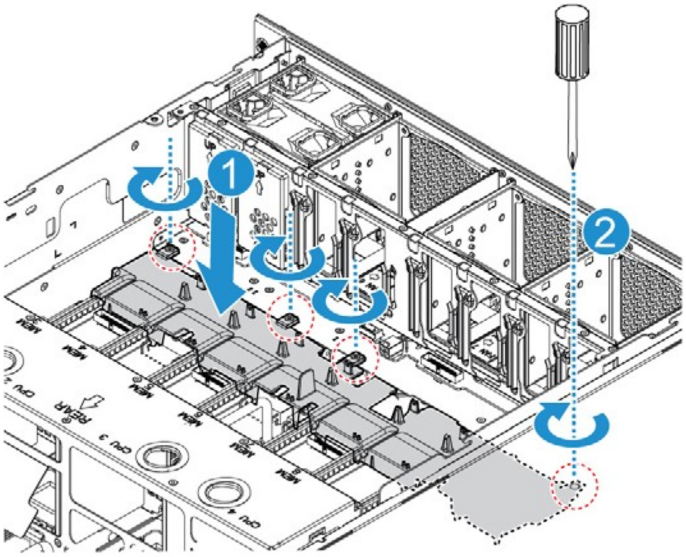


Figure 109. Installing the memory rug

6. Replace the memory dividers. For instructions, see “Installing the Memory Dividers” on page 95.
7. Replace the memory risers. For instructions, see “Installing a Memory Riser” on page 66.
8. Replace the top cover. For instructions, see “Installing the Top Cover” on page 83.

Replacing the Main Board

Removing the Main Board

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove the SAS riser. For instructions, see “Removing the SAS Riser” on page 86.
3. Remove all PCIe add-in cards. For instructions, see “Removing a Non-Hot Swap PCIe Card” on page 84 and “Removing a Hot Swap PCIe Card” on page 58.
4. Remove the I/O riser. For instructions, see “Removing the I/O Riser” on page 92.
5. Remove the chassis mid-brace. For instructions, see “Removing the Chassis Mid-Brace” on page 98.
6. Remove the memory rug. For instructions, see “Removing the Memory Rug” on page 105.
7. Remove all installed processors. For instructions, see “Handling the Intel® Xeon® Processor 7500 Series“ on page 101 and then “Removing a Processor” on page 105. Follow steps 3 through 7 only.
8. Remove the plastic hot swap PCIe dividers.
    a. A plastic captive rivet is on the front of the divider assembly. Pull the captive pin up to release it. See “1” in the following figure.
    b. Lift the divider assembly from the server. See “2” in the figure.

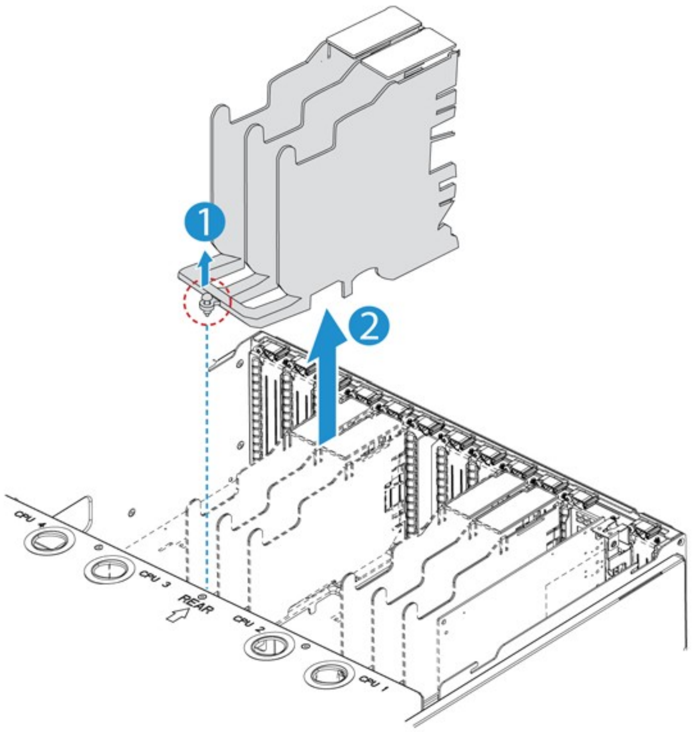


Figure 110. Removing the Hot-Swap PCIe Dividers

9. Disconnect all cables from the main board.
10. Grasp the main board handles and slide the main board forward free of the grounding brackets.
11. Lift the main board up and out of the server.
12. Install a replacement main board. For instructions, see “Installing the Main Board” on page 108.

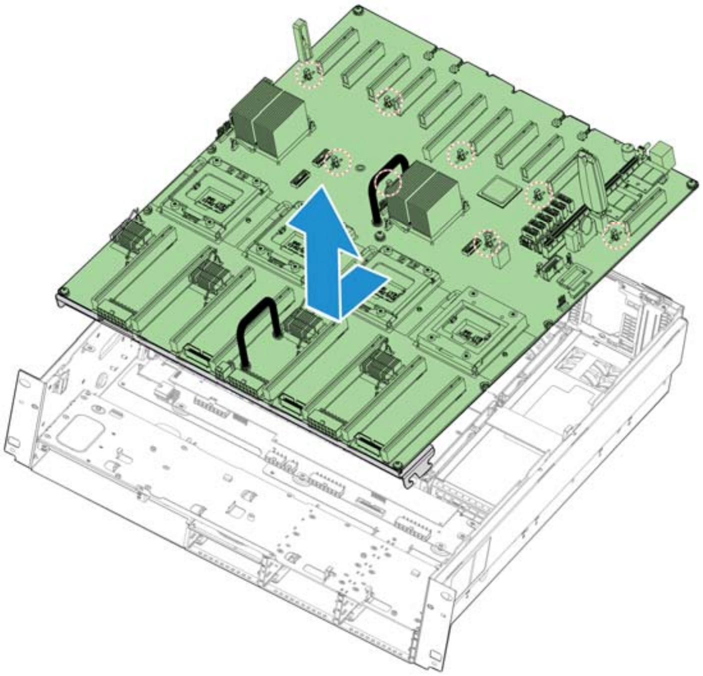


Figure 111. Removing the Main Board

Installing the Main Board

1. Set the main board onto the chassis with the case tabs properly aligned with the slots in the main board. See letter “A” in the following figure.
2. Slide the main board backward till firmly abutting the system rear and the chassis tabs are in contact with the grounding brackets over the main board slots.

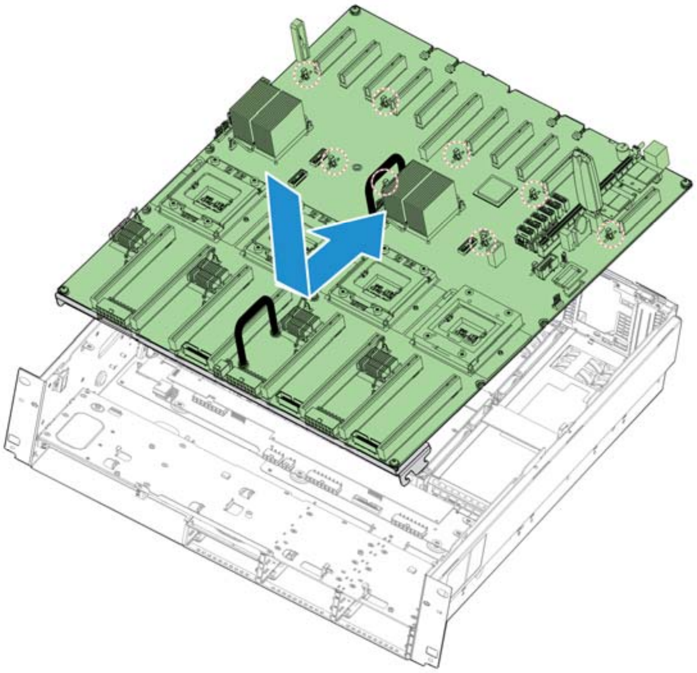


Figure 112. Installing the Main Board

3. Insert the hot-swap PCIe slot dividers (“1”) so the rivet holes in the divider base align with the holes in the main board. Push the captive pin downwards firmly until latched. (“2”). See the following figure.

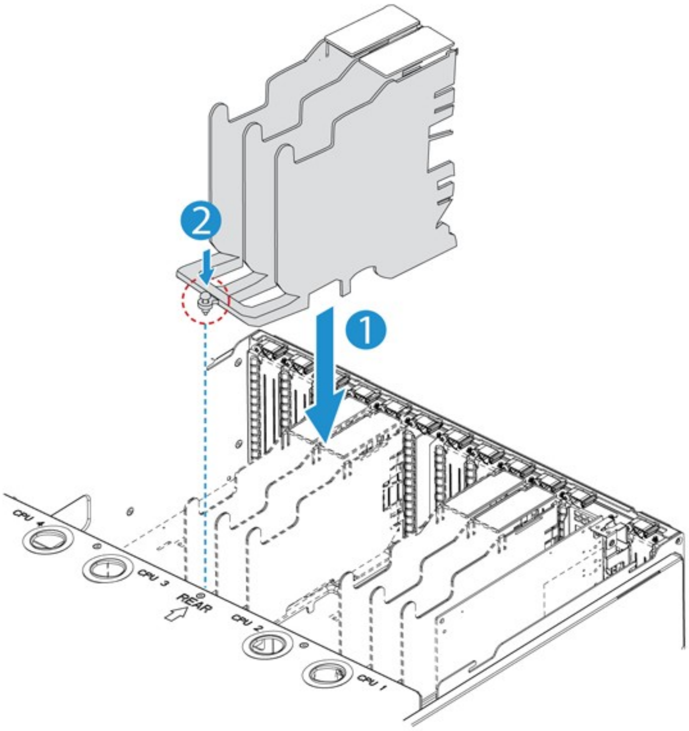


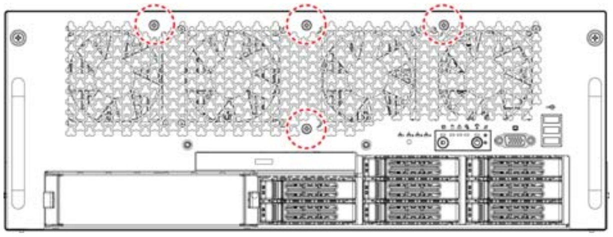
Figure 113. Installing the PCIe Slot Dividers

4. Connect the power and ground cables from the power distribution board to the connectors on the main board.
5. Connect all remaining cables to the main board.
6. Install the SAS riser. For instructions, see “Installing the SAS Riser” on page 87.
7. Install the I/O riser. For instructions, see “Removing the I/O Riser” on page 92.
8. Install the processors. See “Handling the Intel® Xeon® Processor 7500 Series ” on page 101 and then “Installing a Processor” on page 101.
9. Install the center brace. For instructions, see “Installing the Chassis Mid-Brace” on page 99.
10. Install the memory rug. For instructions, see “Installing the Memory Rug” on page 106.
11. Install the memory risers. For instructions see “Installing a Memory Riser” on page 66.
12. Install the memory dividers. For instructions see “Installing the Memory Dividers” on page 95.
13. Install the PCIe cards. For instructions, see “Installing a Non-Hot Swap PCIe Card” on page 84 and “Installing a Hot Swap PCIe Card” on page 59.
14. Install the top cover. For instructions, see “Installing the Top Cover” on page 83.

Removing and Installing the Fan Cage

Removing the Fan Cage

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove all fans. For instructions, see “Removing and Installing System Fans” on page 61.
3. Remove the memory risers. For instructions, see “Removing a Memory Riser” on page 64.
4. Remove the memory dividers. For instructions, see “Removing the Memory Dividers” on page 95.
5. Remove the two screws on the top and four screws on the front. See “1” in the figure below.



6. Lift the fan cage out of the system. See “2” in the following figure.

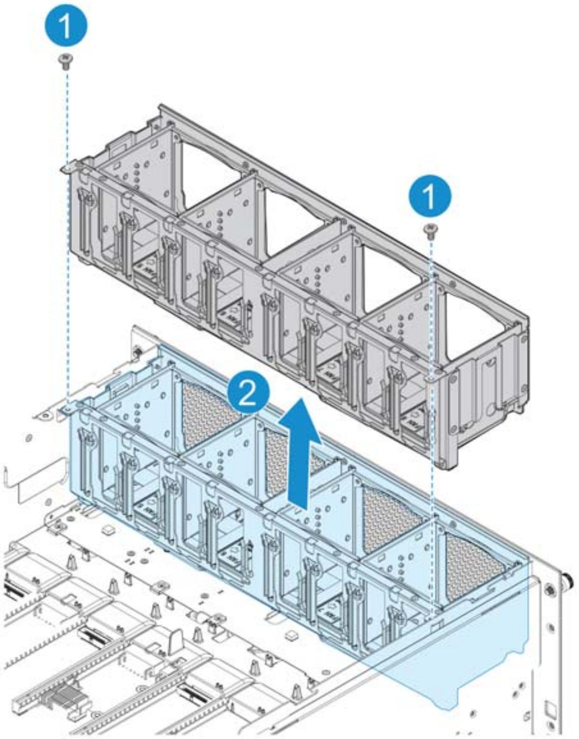
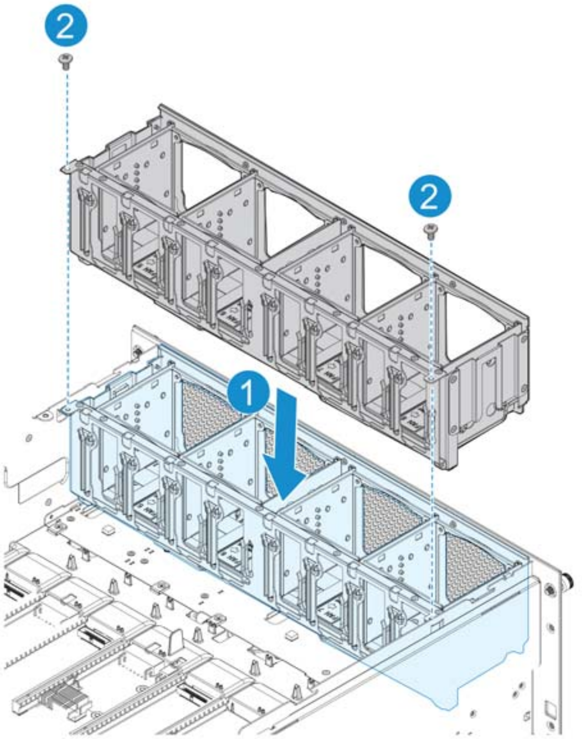


Figure 114. Removing the Fan Cage

Installing the Fan Cage

1. Place the fan cage in the system.



2. Replace the two top screws and the four front screws.

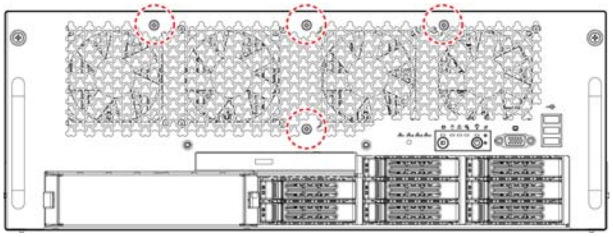


Figure 115. Installing the Fan Cage

3. Replace all fans. For instructions, see “Removing and Installing System Fans” on page 61.
4. Install the memory risers. For instructions see “Installing a Memory Riser” on page 66.
5. Install the memory dividers. For instructions see “Installing the Memory Dividers” on page 95.
6. Install the top cover. For instructions, see “Installing the Top Cover” on page 83.

Replacing the Front Panel Fan Board

Removing the Front Panel Fan Board

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Remove all fans and the fan cage. For instructions, see “Removing the Fan Cage” on page 110.
3. Disconnect all cables attached to the front panel fan board.
4. Remove the four screws on the front panel fan board

5. Slide the board towards the rear of the chassis until the tabs disengage from the board. See “1” in the figure.

6. Lift the board from the chassis (“2”).

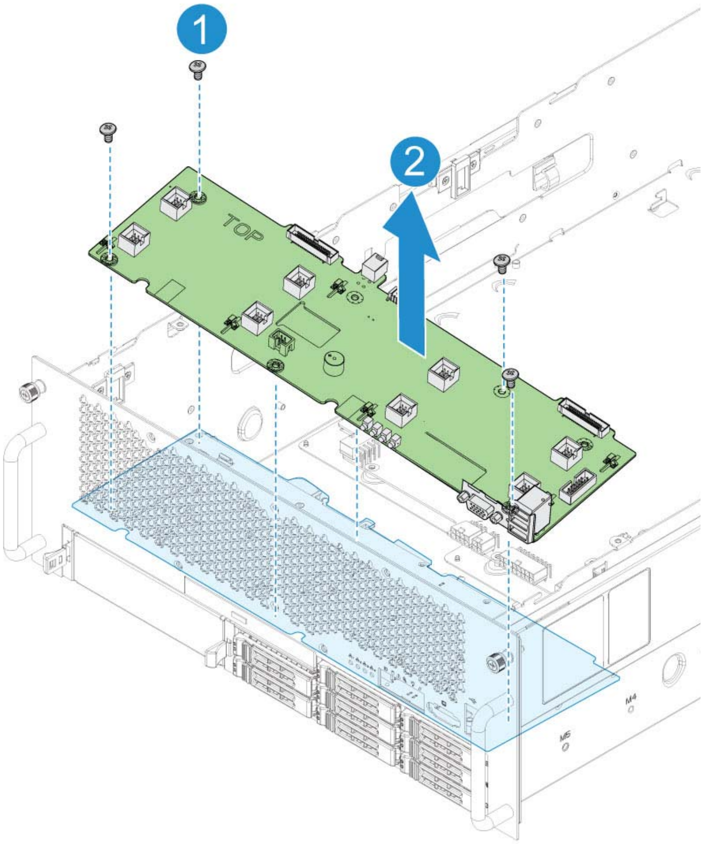


Figure 116. Removing the Front Panel Fan Board

Installing the Front Panel Fan Board

1. Set the front panel fan board in place over the hooks. See number “1” in the following figure.

2. Slide the front panel fan board forward until seated over the hooks (“2”).

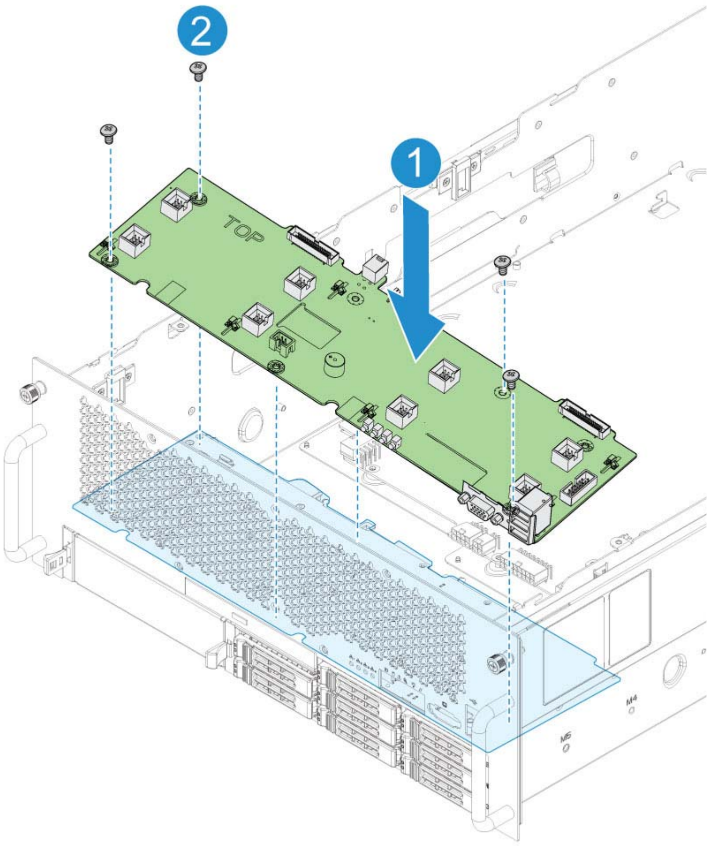


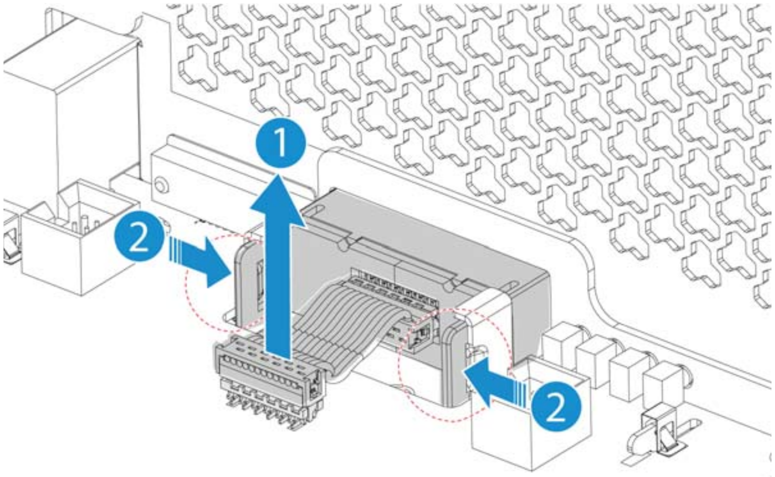
Figure 117. Installing the Front Panel Fan Board

3. Reconnect all cables you disconnected when you removed the front panel fan board.
4. Replace the fan cage. For instructions, see “Installing the Fan Cage” on page 111.
5. Replace all fans. For instructions, see “Installing the Hot-Swap Fan Modules” on page 62.
6. Install the top cover. For instructions, see “Installing the Top Cover” on page 83.

Replacing the Operator Panel

Removing the Operator Panel

1. Remove the top cover.
2. Remove all memory dividers and memory risers.
3. Remove the fan cage.
4. Disconnect the front panel fan board cable from the inside of the chassis, see “1” in the following drawing.
5. Squeeze both sides of the operator panel to release the panel, see “2” in the following drawing.



6. Push the operator panel module out of the chassis.

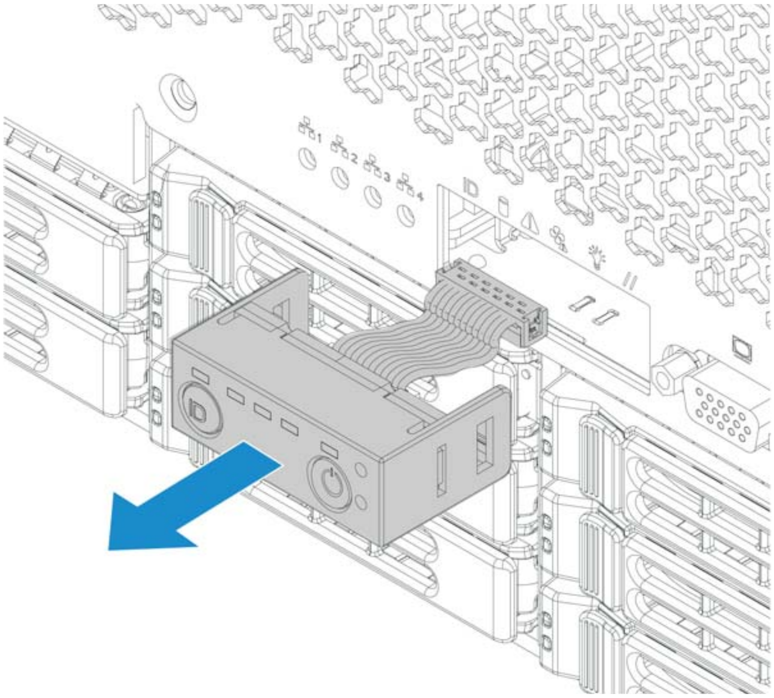


Figure 118. Removing the Operator Panel

Installing the Operator Panel

1. Insert the operator panel into the retention guides taking care of that the cable is inserted through the chassis as shown in the following image.
2. Connect the operator panel cable.
3. Install the fan cage
4. Install all fans
5. Install all memory dividers and memory risers
6. Install the top cover.

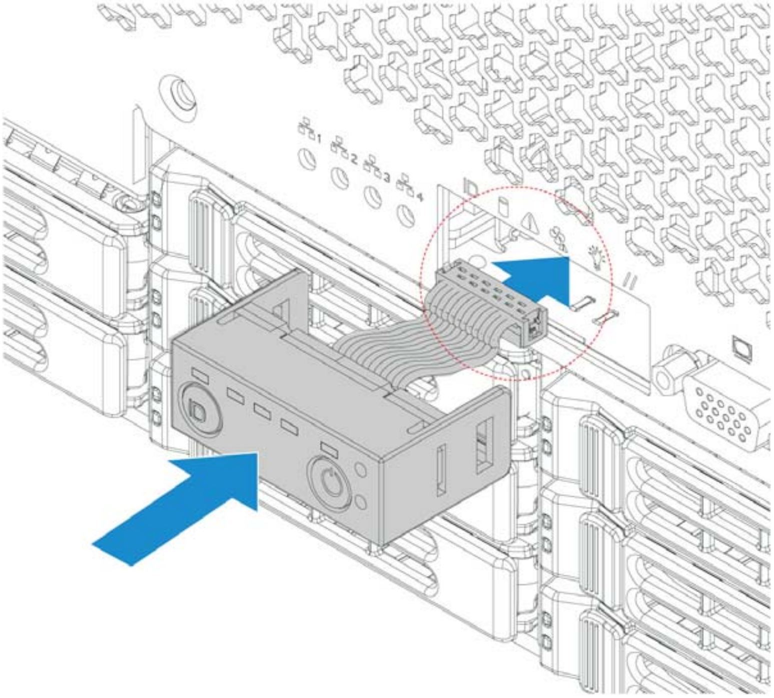


Figure 119. Installing the Operator Panel

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Installing and Removing a 5 ¼-inch Peripheral Device

The server system accommodates one 5 ¼-inch peripheral device. To install or remove this device, the system must be powered down and the power cords removed.

> *Note: Value SKU systems use the 6 Mainboard SATA connectors for the HSBP. You will need to disconnect a SATA cable from a hard drive bay on the HSBP and connect it to the peripheral to be able to use it. The hard drive bay corresponding to the removed SATA cable will no longer be available.*

Installing a 5 ¼-inch Peripheral Device

1. Push the tabs at each side of the peripheral device. See letter “A” in the following figure.
2. Hold the tabs in while pulling the peripheral device from the bay. See letter “B” in the figure.

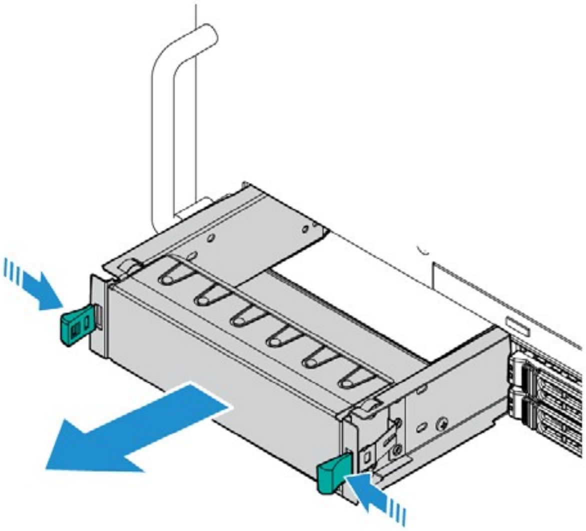


Figure 120. Removing a 5¼-inch Peripheral Device from Server

3. Remove the screws that attach the slide rails to the filler panel.

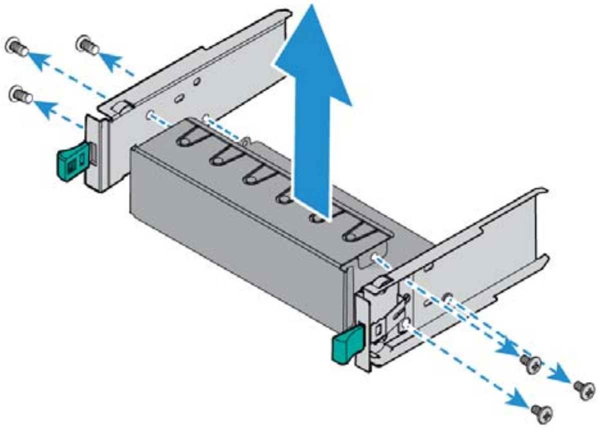


Figure 121. Removing the slide rails from the 5.25" filler panel

4. Attach the slide rails to the device using two (2) of the screws removed from the filler panel. See the following figure.

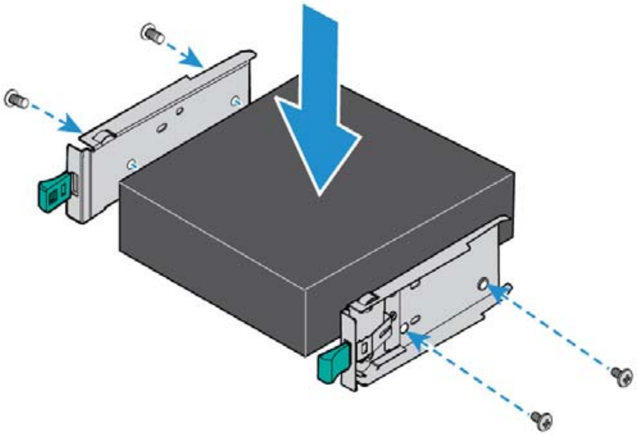


Figure 122.Attaching the slide rails to the 5.25" peripheral

5. Pull the power cable through the 5 ¼-inch peripheral opening.
6. Attach cabling to the 5 ¼-inch peripheral according to the manufacturer's instructions.
7. Slide the 5 ¼-inch peripheral device into the server until it clicks into place. See the following figure.

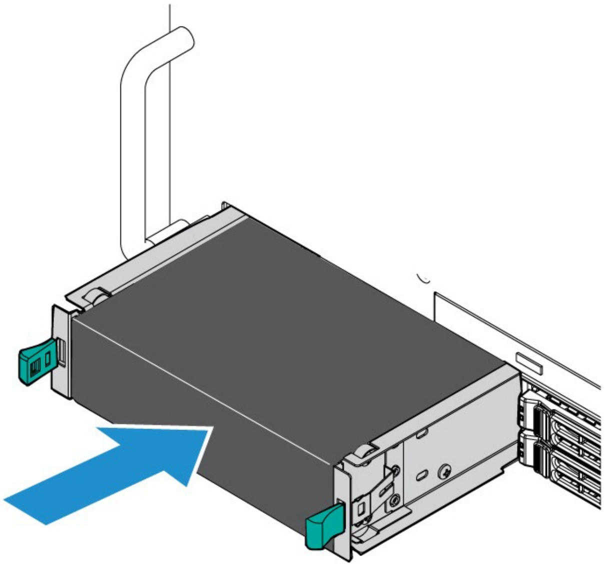


Figure 123. Installing a 5¼-inch Peripheral Device in the Server

Removing a 5 ¼-inch Peripheral Device

1. Push the tabs at each side of the peripheral device.
2. Hold the tabs in while pulling the peripheral device from the bay.
3. Disconnect any cables at the rear of the device.
4. Unscrew the slide rails from the 5 ¼-inch peripheral device.
5. Install the slide rails on the replacement device or install them on the 5 ¼-inch filler panel that came with your server.
6. Slide the replacement device or filler panel into the 5 ¼-inch bay until it clicks into place.

Replacing the Hot Swap Backplane Board

The Hot Swap Backplane (HSBP) supports up to eight 2.5-inch SATA or SAS drives. The Enterprise SKU supports all 8 drive connectors available on the hot-swap backplane.

Removing the Hot Swap Backplane Board

1. Remove all hot swap hard drive carriers. For instructions, see “Removing a Hard Drive Carrier” on page 54.
2. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
3. Remove all memory dividers and memory risers
4. Remove the memory rug. For instructions, see “Removing the Memory Rug” on page 105.
5. Remove the optical drive. For instructions, see “Removing an Optical Disk Drive” on page 96.
6. Disconnect all cables attached to the Hot Swap Backplane Board (1).
7. Pull the backplane upward to disengage the hooks (2).

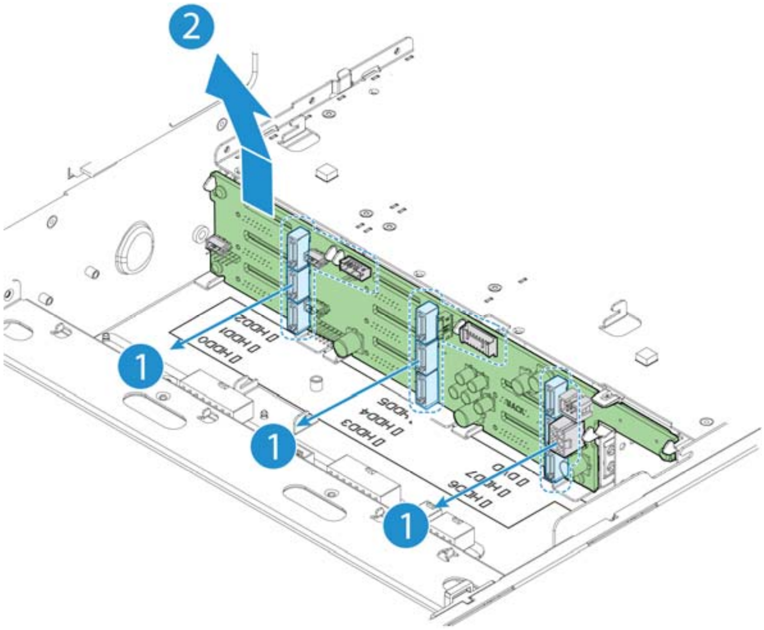


Figure 124. Removing the Hot Swap Backplane

8. Lift the hot swap backplane out and away to remove it.
9. Store the hot swap backplane in an anti-static bag.
10. Install the replacement hot swap backplane. For instructions, see “Installing the Hot Swap Backplane Board” on page 119.

Installing the Hot Swap Backplane Board

1. Place the hot swap backplane board over the chassis hooks and then push the backplane downward to engage the hooks (1).
2. Connect the cables you disconnected when you removed the hot swap backplane board (2).

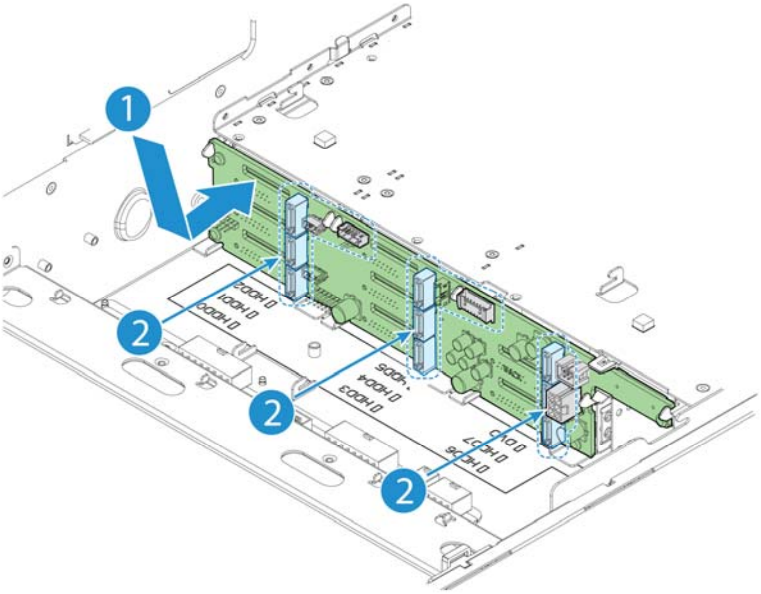


Figure 125. Installing the Hot Swap Backplane

3. Install the optical drive. For instructions, see “Installing an Optical Disk Drive” on page 97.
4. Install the memory rug. For instructions, see “Installing the Memory Rug” on page 106.
5. Install the hot swap hard drives and hard drive carriers. For instructions, see “Installing a Hard Drive Carrier” on page 56.

Replacing the Power Distribution Board

The power distribution board provides the output power interface between the hot swap power supplies and the main board.

Removing the Power Distribution Board

1. Remove the power supplies. For instructions, see "Hot Swapping a Power Supply" on page 56. Follow steps 2 through 4 only.
2. Remove the top cover. For instructions, see "Removing the Top Cover" on page 82.
3. Remove all memory dividers and memory risers, see Removing the Memory Dividers on page 95 and Removing a Memory Riser on page 64.
4. Remove the chassis mid-brace, see Removing the Chassis Mid-Brace on page 98.
5. Remove the memory rug, see Removing the Memory Rug on page 105.
6. Remove the main board. For instructions, see "Removing the Main Board" on page 107.
7. Disconnect all cables from the power distribution board, see "1" in the following figure.
8. Disconnect all cables from the hot swap backplane, see "1" in the following figure.
9. Remove the three screws on the power distribution board, see "2" in the following figure.
10. Lift the board from the chassis, see "3" in the following figure.

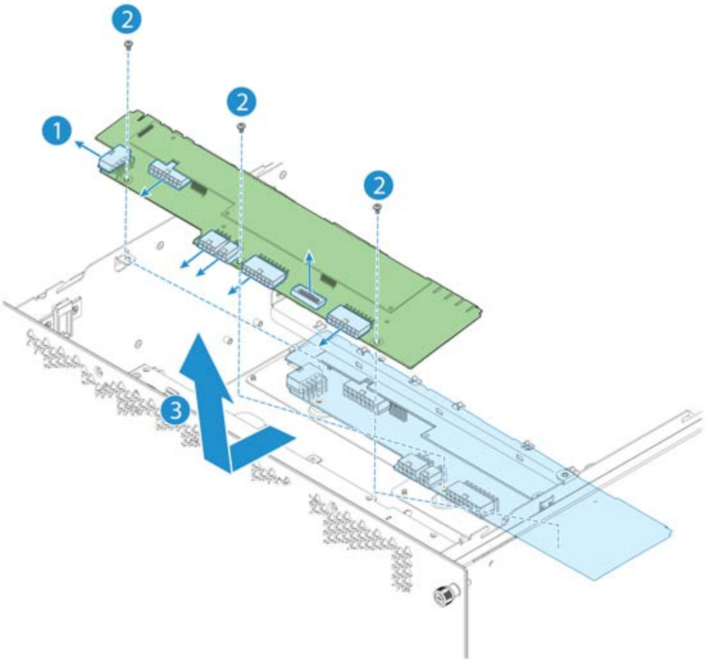


Figure 126. Removing the Power Distribution Board

Installing the Power Distribution Board

1. Set the power distribution board in place.
2. Use the three screws to secure the power distribution board to the chassis.
3. Connect the cables between the power distribution board and the system boards.

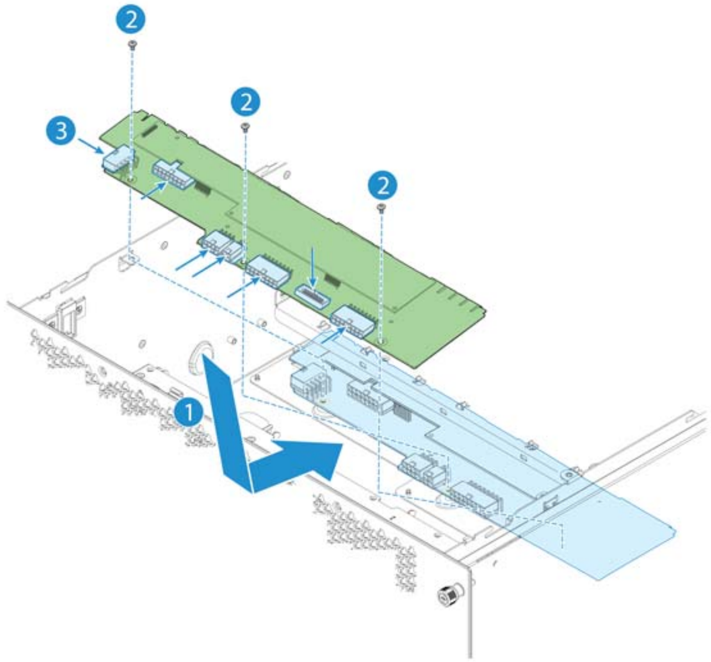


Figure 127. Installing the Power Distribution Board

4. Install the memory rug
5. Install the chassis mid-brace
6. Install all memory dividers and memory risers
7. Install the power supplies. For instructions, see “Hot Swapping a Power Supply” on page 56. Follow steps 7 through 9 only.
8. Install the main board. For instructions, see “Installing the Main Board” on page 108.
9. Install the top cover. For instructions, see “Installing the Top Cover” on page 83.

Replacing the CMOS Battery

The 3-volt lithium battery on the main board powers the real-time clock (RTC) for more than 5 years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM and the Real Time Clock (such as the date and time) can be wrong. Contact your customer service representative or dealer for a list of approved replacement batteries.

The following warning and translations are required by specific certifying agencies to be printed immediately adjacent to the procedure for removing the battery.

Warning	*Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.*
Advarsel:	*Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.*
Advarsel:	*Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.*
Varning:	*Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.*
Varoitus:	*Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.*

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 82.
2. Place your finger on the edge of the battery, between the two smaller prongs that hold the battery in place.
3. Without pulling up on the battery, push the battery toward the larger prongs until the edge of the battery clears the small prongs.
4. Maintain pressure on the battery while pulling up on the released edge of the battery to lift it from the server. See the following figure.

Caution *Do not attempt to pull the battery up until it is pushed clear of the smaller prongs. Doing so may damage the battery holder.*

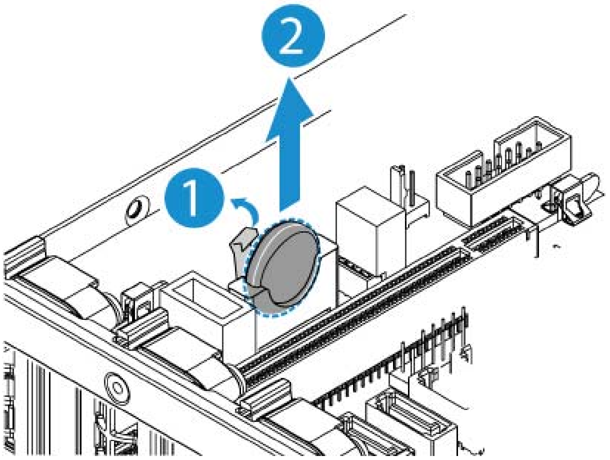


Figure 128. Removing the CMOS Battery

5. Dispose of the battery according to local ordinance.
6. Remove the new lithium battery from its package.
7. Being careful to observe the correct polarity, insert the battery at an angle into the battery socket with the edge of the battery under the larger prongs in the battery socket.
8. Push the battery toward the larger prongs while pushing down on the raised edge of the battery until it clicks into place under all four prongs.

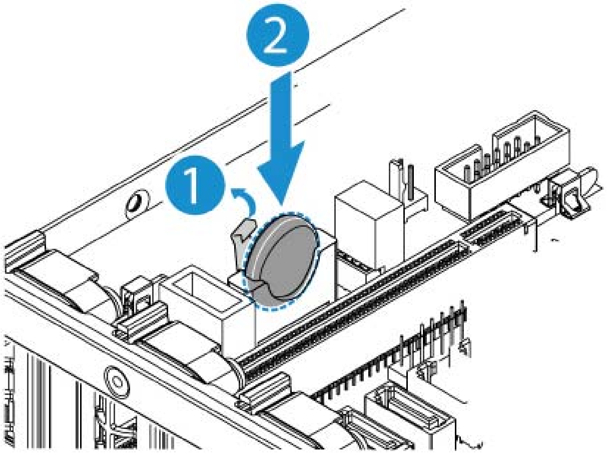


Figure 129. Installing the CMOS Battery

9. Install the top cover. For instructions, see “Installing the Top Cover” on page 83.

Using the BIOS and utilities

Splash Logo / Diagnostic Screen

The Logo / Diagnostic Screen appear in one of two forms:

- If Quiet Boot is enabled in the BIOS setup, a logo splash screen is displayed. By default, Quiet Boot is enabled in the BIOS setup. If the logo is displayed during POST, press <Esc> to hide the logo and display the diagnostic screen.
- If a logo is not present in the flash ROM, or if Quiet Boot is disabled in the system configuration, the summary and diagnostic screen is displayed.

The diagnostic screen displays the following information:

- BIOS ID.
- Platform name.
- Total memory detected (Total size of all installed DDR3 DIMMs).
- Processor information (Intel branded string, speed, and number of physical processors identified).
- Keyboards detected, if plugged in.
- Mouse devices detected, if plugged in.

BIOS Boot Popup Menu

The BIOS Boot Specification (BBS) provides a Boot pop-up menu that can be invoked by pressing the <F6> key during POST. The BBS pop-up menu displays all available boot devices. The list order in the pop-up menu is not the same as the boot order in BIOS setup. The pop-up menu simply lists all of the bootable devices from which the system can be booted, and allows a manual selection of the desired boot device.

When an Administrator password is installed in the Setup, the Administrator password will be required in order to access the Boot pop-up menu using the <F6> key. If a User password is entered, the Boot pop-up menu will not even appear – the user will be taken directly to the Boot Manager in the Setup, where a User password allows only booting in the order previously defined by the Administrator.

BIOS Setup Utility

The BIOS Setup utility is a text-based utility that allows the user to configure the system and view current settings and environment information for the platform devices. The Setup utility controls the platform's built-in devices, the boot manager, and error manager.

The BIOS Setup interface consists of a number of pages or screens. Each page contains information or links to other pages. The advanced tab in Setup displays a list of general categories as links. These links lead to pages containing a specific category‘s configuration.

The following sections describe the look and behavior for the platform setup.

Operation

The BIOS Setup has the following features:

- Localization - The BIOS Setup uses the Unicode standard and is capable of displaying setup forms in all languages currently included in the Unicode standard. The Intel® Server Board BIOS is only available in English.
- Console Redirection - The BIOS Setup is functional via console redirection over various terminal emulation standards. This may limit some functionality for compatibility, for example, usage of colors or some keys or key sequences or support of pointing devices.

Page Layout

The setup page layout is sectioned into functional areas. Each occupies a specific area of the screen and has dedicated functionality. The following table lists and describes each functional area.

Table 22. Memory Thermal Throttling OEM SDR bytes 6:N details

Functional Area	Description
Title Bar	The title bar is located at the top of the screen and displays the title of the form (page) the user is currently viewing. It may also display navigational information.
Setup Item List	The Setup Item List is a set of controllable and informational items. Each item in the list occupies the left column of the screen. A Setup Item may also open a new window with more options for that functionality on the board.
Item Specific Help Area	The Item specific Help area is located on the right side of the screen and contains help text for the highlighted Setup Item. Help information may include the meaning and usage of the item, allowable values, effects of the options, etc.
Keyboard Command Bar	The Keyboard Command Bar is located at the bottom right of the screen and continuously displays help for keyboard special keys and navigation keys.

Entering BIOS Setup

To enter the BIOS Setup, press the <F2>function key during boot time when the OEM or Intel logo is displayed. The following message is displayed on the diagnostics screen and under the Quiet Boot logo screen:

```
Press <F2> to enter setup
```

When the Setup is entered, the Main screen is displayed. However, serious errors cause the system to display the Error Manager screen instead of the Main screen.

Keyboard Commands

The bottom right portion of the Setup screen provides a list of commands that are used to navigate through the Setup utility. These commands are displayed at all times.

Each Setup menu page contains a number of features. Each feature is associated with a value field, except those used for informative purposes. Each value field contains configurable parameters. Depending on the security option chosen and in effect by the password, a menu feature‘s value may or may not be changed. If a value cannot be changed, its field is made inaccessible and appears grayed out.

Table 23. BIOS Setup: Keyboard Command Bar

Key	Option	Description
<Enter>	Execute Command	The <Enter> key is used to activate submenu when the selected feature is a submenu, or to display a pick list if a selected option has a value field, or to select a subfield for multi-valued features like time and date. If a pick list is displayed, the <Enter> key selects the currently highlighted item, undoes the pick list, and returns the focus to the parent menu.
<Esc>	Exit	The <Esc> key provides a mechanism for backing out of any field. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the <Esc> key is pressed in any submenu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If “No” is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <Esc> was pressed, without affecting any existing settings. If “Yes” is selected and the <Enter> key is pressed, the setup is exited and the BIOS returns to the main System Options Menu screen.
↑	Select Item	The up arrow is used to select the previous value in a pick list, or the previous option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.

↓	Select Item	The down arrow is used to select the next value in a menu item's option list, or a value field's pick list. The selected item must then be activated by pressing the <Enter> key.
↔	Select Menu	The left and right arrow keys are used to move between the major menu pages. The keys have no effect if a sub-menu or pick list is displayed.
<Tab>	Select Field	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
-	Change Value	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
+	Change Value	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboards, but will have the same effect.
<F9>	Setup Defaults	Pressing the <F9> key causes the following to display: Load Optimized Defaults? Yes No If "Yes" is highlighted and <Enter> is pressed, all Setup fields are set to their default values. If "No" is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.

Menu Selection Bar

The Menu selection bar is located at the top of the BIOS Setup Utility screen. It displays the major menu selections available to the user. By using the left and right arrow keys, the user can select the listed menus. Some menus are hidden and become available by scrolling to the left or right of the current selection.

BIOS Setup Utility Screens

The following sections describe the screens available for the configuration of a server platform.

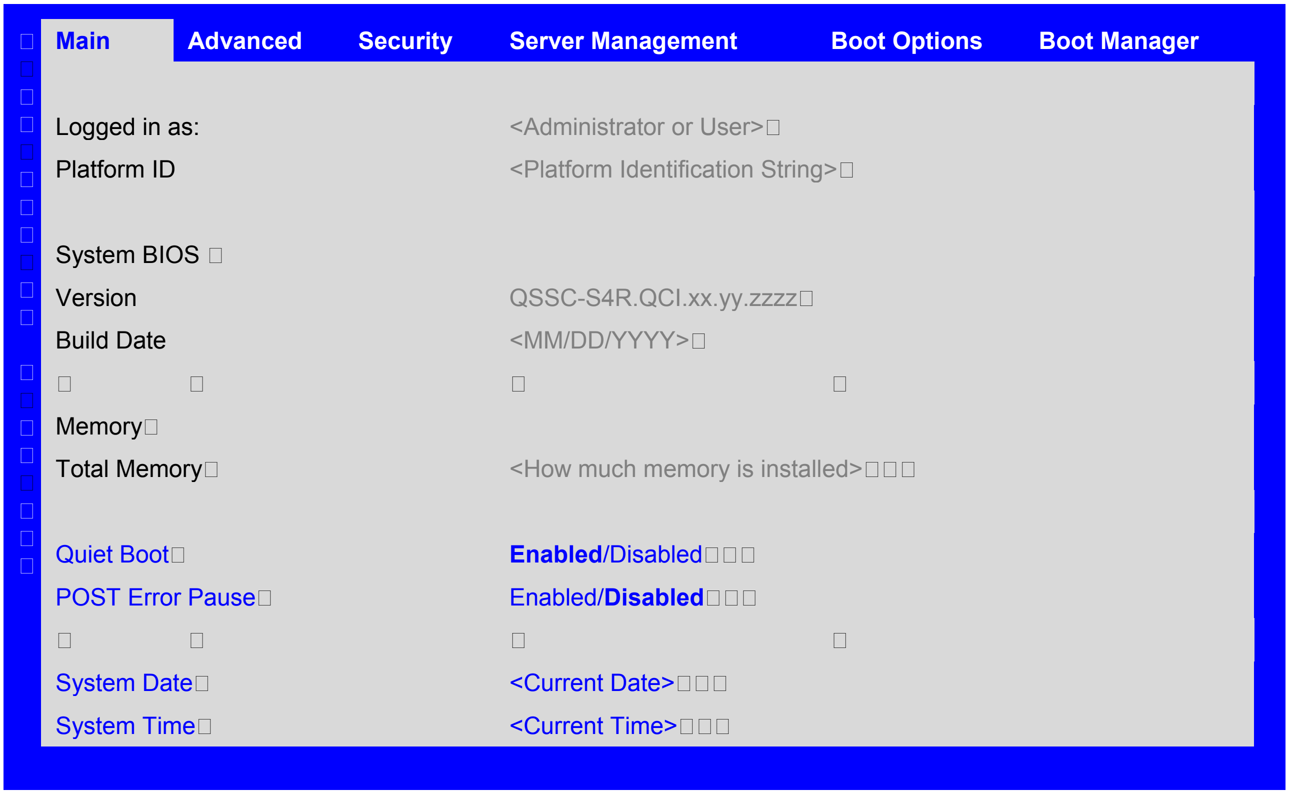
In these sections, tables describe the contents of each screen. These tables follow the following guidelines:

- The text and values in the Setup Item, Options, and Help Text columns displayed on the BIOS Setup screens.
- In the Options column, the default values are displayed in bold. These values do not appear in bold on the BIOS Setup screen. The bold text in this document is to serve as a reference point.
- The Comments column provides additional information where it may be helpful. This information does not appear on the BIOS Setup screens.
- Information enclosed in angular brackets (< >) in the screen shots identifies text that can vary, depending on the option(s) installed. For example <Current Date> is replaced by the actual current date.
- Information enclosed in square brackets ([ ]) in the tables identifies areas where the user must type in text instead of selecting from a provided option.
- Whenever information is changed (except Date and Time), the system requires a save and reboot to take place. Pressing <ESC> discards the changes and boots the system according to the boot order set from the last boot.

Main Screen

The Main screen is the first screen that appears when the BIOS Setup is entered, unless an error has occurred. If an error has occurred, the Error Manager screen appears instead.

Figure 130. Setup Utility — Main Screen Display



Logged in as: <Administrator or User>

Platform ID <Platform Identification String>

System BIOS

Version QSSC-S4R.QCI.xx.yy.zzzz

Build Date <MM/DD/YYYY>

Memory

Total Memory <How much memory is installed>

Quiet Boot **Enabled**/Disabled

POST Error Pause Enabled/**Disabled**

System Date <Current Date>

System Time <Current Time>

Table 24. Setup Utility — Main Screen Fields

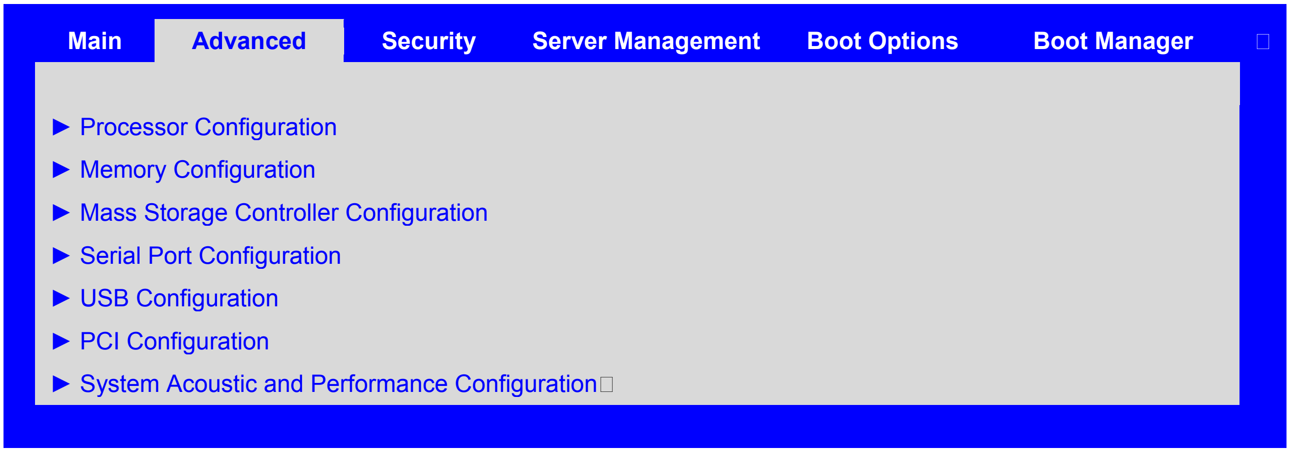
Setup Item	Options	Help Text	Comments
Logged in as:			**Information only**. Displays password level that setup is running in: Administrator or User. With no passwords set, Administrator is the default mode.
Platform ID			**Information only**. Displays the Platform ID.
System BIOS			
Version			**Information only**. Displays the current BIOS version. xx = major version yy = minor version zzzz = build number
Build Date			**Information only**. Displays the current BIOS build date.
Memory			

Setup Item	Options	Help Text	Comments
Size			**Information only**. Displays the total physical memory installed in the system, in MB or GB. The term physical memory indicates the total memory discovered in the form of installed DDR3 DIMMs.
Quiet Boot	**Enabled** Disabled	[Enabled] – Display the logo screen during POST. [Disabled] – Display the diagnostic screen during POST.	
POST Error Pause	Enabled **Disabled**	[Enabled] – Go to the Error Manager for critical POST errors. [Disabled] – Attempt to boot and do not go to the Error Manager for critical POST errors.	If enabled, the POST Error Pause option takes the system to the error manager to review the errors when major errors occur. Minor and fatal error displays are not affected by this setting.
System Date	[Day of week MM/DD/YYYY]	System Date has configurable fields for Month, Day, and Year. Use [Enter] or [Tab] key to select the next field. Use [+] or [-] key to modify the selected field.	
System Time	[HH:MM:SS]	System Time has configurable fields for Hours, Minutes, and Seconds. Hours are in 24-hour format. Use [Enter] or [Tab] key to select the next field. Use [+] or [-] key to modify the selected field.	

Advanced Screen

The Advanced screen provides an access point to configure several options. On this screen, you can select the option to be configured. Configurations are performed on the selected screen, and not directly on the Advanced screen.

To access this screen from the Main screen, press the right arrow until the **Advanced** screen is selected.



- ▶ Processor Configuration
- ▶ Memory Configuration
- ▶ Mass Storage Controller Configuration
- ▶ Serial Port Configuration
- ▶ USB Configuration
- ▶ PCI Configuration
- ▶ System Acoustic and Performance Configuration

Figure 131. Setup Utility — Advanced Screen

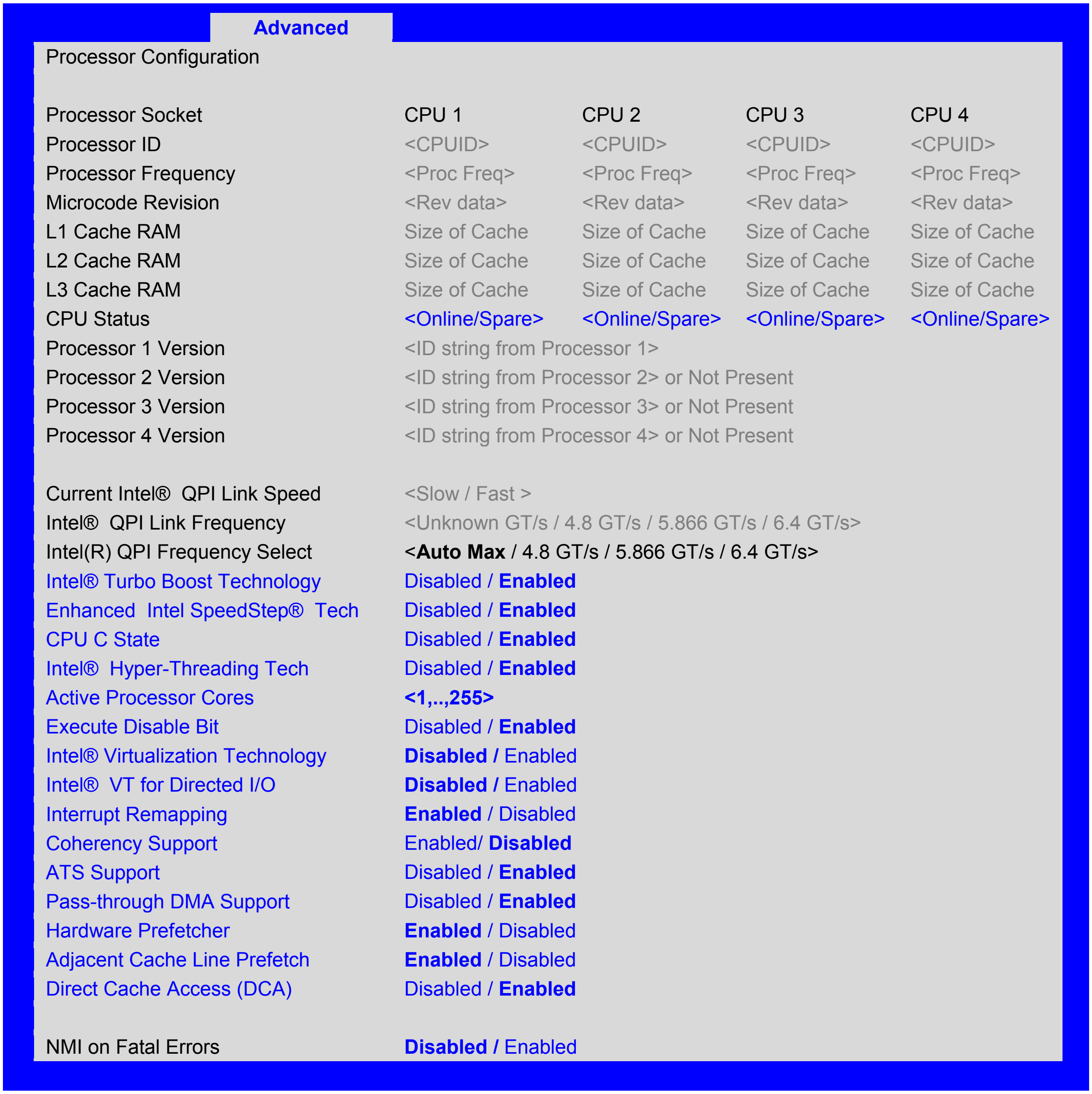
Table 25. Setup Utility — Advanced Screen Display Fields

Setup	Options	Help Text	Comments
Processor Configuration		View/Configure processor information and settings.	
Memory Configuration		View/Configure memory information and settings.	
Mass Storage Controller Configuration		View/Configure mass storage controller information and settings.	
Serial Port Configuration		View/Configure serial port information and settings.	
USB Configuration		View/Configure USB information and settings.	
PCI Configuration		View/Configure PCI information and settings.	
System Acoustic and Performance Configuration		View/Configure system acoustic and performance information and settings.	

Processor Configuration Screen

The Processor configuration screen allows you to view the processor core frequency, system bus frequency, and to enable or disable several processor options. This screen also allows the user to view information about a specific processor.

To access this screen from the Main screen, select **Advanced** > **Processor**.



Processor Configuration

Processor Socket	CPU 1	CPU 2	CPU 3	CPU 4
Processor ID	<CPUID>	<CPUID>	<CPUID>	<CPUID>
Processor Frequency	<Proc Freq>	<Proc Freq>	<Proc Freq>	<Proc Freq>
Microcode Revision	<Rev data>	<Rev data>	<Rev data>	<Rev data>
L1 Cache RAM	Size of Cache	Size of Cache	Size of Cache	Size of Cache
L2 Cache RAM	Size of Cache	Size of Cache	Size of Cache	Size of Cache
L3 Cache RAM	Size of Cache	Size of Cache	Size of Cache	Size of Cache
CPU Status	<Online/Spare>	<Online/Spare>	<Online/Spare>	<Online/Spare>
Processor 1 Version	<ID string from Processor 1>			
Processor 2 Version	<ID string from Processor 2> or Not Present			
Processor 3 Version	<ID string from Processor 3> or Not Present			
Processor 4 Version	<ID string from Processor 4> or Not Present			

Current Intel® QPI Link Speed	<Slow / Fast >
Intel® QPI Link Frequency	<Unknown GT/s / 4.8 GT/s / 5.866 GT/s / 6.4 GT/s>
Intel(R) QPI Frequency Select	<**Auto Max** / 4.8 GT/s / 5.866 GT/s / 6.4 GT/s>
Intel® Turbo Boost Technology	Disabled / **Enabled**
Enhanced Intel SpeedStep® Tech	Disabled / **Enabled**
CPU C State	Disabled / **Enabled**
Intel® Hyper-Threading Tech	Disabled / **Enabled**
Active Processor Cores	**<1,..,255>**
Execute Disable Bit	Disabled / **Enabled**
Intel® Virtualization Technology	**Disabled** / Enabled
Intel® VT for Directed I/O	**Disabled** / Enabled
Interrupt Remapping	**Enabled** / Disabled
Coherency Support	Enabled/ **Disabled**
ATS Support	Disabled / **Enabled**
Pass-through DMA Support	Disabled / **Enabled**
Hardware Prefetcher	**Enabled** / Disabled
Adjacent Cache Line Prefetch	**Enabled** / Disabled
Direct Cache Access (DCA)	Disabled / **Enabled**
NMI on Fatal Errors	**Disabled** / Enabled

Figure 132. Setup Utility — Processor Configuration Screen

Table 26. Setup Utility — Processor Configuration Screen Fields

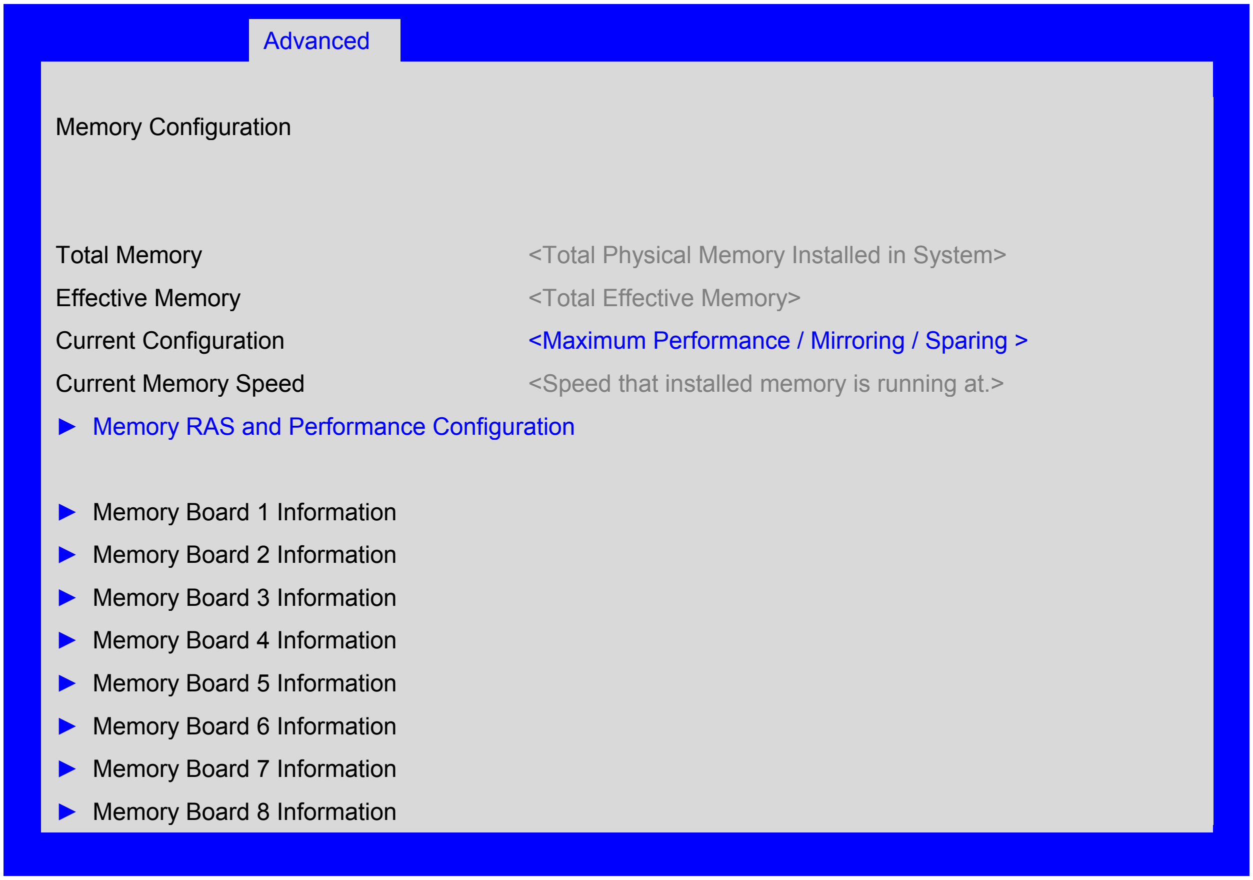
Setup Item	Options (Default in Boldface)	Help Text	Comments
Processor ID			Information only. Processor CPUID
Processor Frequency			Information only. Current frequency of the processor.
Core Frequency			Information only. Frequency at which the processors are currently running.
Microcode Revision			Information only. Revision of the loaded microcode.
L1 Cache RAM			Information only. Size of the Processor L1 Cache.
L2 Cache RAM			Information only. Size of the Processor L2 Cache
L3 Cache RAM			Information only. Size of the Processor L3 Cache.
CPU Status			Information only. Indicates whether this CPU is online, or selected as spare.
Processor 1 Version			Information only. ID string from the Processor.
Processor 2 Version			Information only. ID string from the Processor.
Processor 3 Version			Information only. ID string from the Processor.
Processor 4 Version			Information only. ID string from the Processor.
Current Intel® QPI Link Speed			Information only. Current speed that the QPI Link is using.
Intel® QPI Link Frequency			Information only. Current frequency that the QPI Link is using.
Intel(R) QPI Frequency Select	**Auto Max** 4.8 GT/s 5.866 GT/s 6.4 GT/s	Allows for selecting the IOH Intel(R) QuickPath Interconnect Frequency. Recommended to leave in [Auto Max] so that BIOS can match the processor and IOH Intel(R) QuickPath Interconnect frequencies.\n\nSet to [Auto Strap] to force processor to the IOH strapped frequency. If not strapped then [Auto Max] frequency will be used.	
Intel® Turbo Boost Technology	Disabled **Enabled**	Intel® Turbo Boost Technology allows the processor to automatically increase its frequency if it is running below power, temperature, and current specifications.	This option is only visible if all processors in the system Intel® Turbo Boost Technology.
Enhanced Intel SpeedStep® Technology	Disabled **Enabled**	Enhanced Intel SpeedStep® Technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production. Contact your OS vendor regarding OS support of this feature.	
CPU C State	Disabled **Enabled**	Significantly reduces the power of the processor during idle periods.\n\nContact your OS vendor regarding OS support of this feature.	
Intel® Hyper-Threading Technology	Disabled **Enabled**	Intel® Hyper-Threading Technology allows multithreaded software applications to execute threads in parallel within each processor. Contact your OS vendor regarding OS support of this feature.	
Active Processor Cores	1,..,255	Each bit position represents a core to be enabled in each processor package.	
Execute Disable Bit	Disabled **Enabled**	Execute Disable Bit can help prevent certain classes of malicious buffer overflow attacks. Contact your OS vendor regarding OS support of this feature.	
Intel® Virtualization Technology	**Disabled** Enabled	Intel® Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions. Note: A change to this option requires the system to be powered off and then back on before the setting takes	

Setup Item	Options (Default in Boldface)	Help Text	Comments
		effect.	
Intel® Virtualization Technology for Directed I/O	**Disabled** Enabled	Enable/Disable Intel® Virtualization Technology for Directed I/O(Intel® VT-d). Report the I/O device assignment to VMM through DMAR ACPI Tables	
Interrupt Remapping	Disabled **Enabled**	Enable/Disable Intel® VT-d Interrupt Remapping support.	This option only appears when Intel® Virtualization Technology for Directed I/O is enabled.
Coherency Support	**Disabled** Enabled	Enable/Disable Intel® VT-d Coherency support.	This option only appears when Intel® Virtualization Technology for Directed I/O is enabled.
ATS Support	Disabled **Enabled**	Enable/Disable Intel® VT-d Address Translation Services (ATS) support.	This option only appears when Intel® Virtualization Technology for Directed I/O is enabled.
Pass-through DMA Support	Disabled **Enabled**	Enable/Disable Intel® VT-d Pass-through DMA support.	This option only appears when Intel® Virtualization Technology for Directed I/O is enabled.
Hardware Prefetcher	Disabled **Enabled**	Hardware Prefetcher is a speculative prefetch unit within the processor(s). **Note:** Modifying this setting may affect system performance.	
Adjacent Cache Line Prefetch	**Enabled** Disabled	[Enabled] - Cache lines are fetched in pairs (even line + odd line). [Disabled] - Only the current cache line required is fetched. **Note:** Modifying this setting may affect system performance.	
Direct Cache Access (DCA)	Disabled **Enabled**	Allows processors to increase the I/O performance by placing data from I/O devices directly into the processor cache.	
NMI on Fatal Errors	**Disabled** Enabled	When enabled, causes NMI to be the preferred mode of halting OS instead of the default Machine Check mode	

Memory Configuration Screen

The Memory configuration screen allows you to view details about the system memory DDR3 DIMMs that are installed. This screen also allows you to open the Configure Memory RAS and Performance screen.

To access this screen from the Main screen, select **Advanced** > **Memory Configuration**.



Advanced

Memory Configuration

Total Memory	<Total Physical Memory Installed in System>
Effective Memory	<Total Effective Memory>
Current Configuration	<Maximum Performance / Mirroring / Sparing >
Current Memory Speed	<Speed that installed memory is running at.>

► Memory RAS and Performance Configuration

► Memory Board 1 Information
► Memory Board 2 Information
► Memory Board 3 Information
► Memory Board 4 Information
► Memory Board 5 Information
► Memory Board 6 Information
► Memory Board 7 Information
► Memory Board 8 Information

Figure 133. Setup Utility — Memory Configuration Screen

Table 27. Setup Utility — Memory Configuration Screen Fields

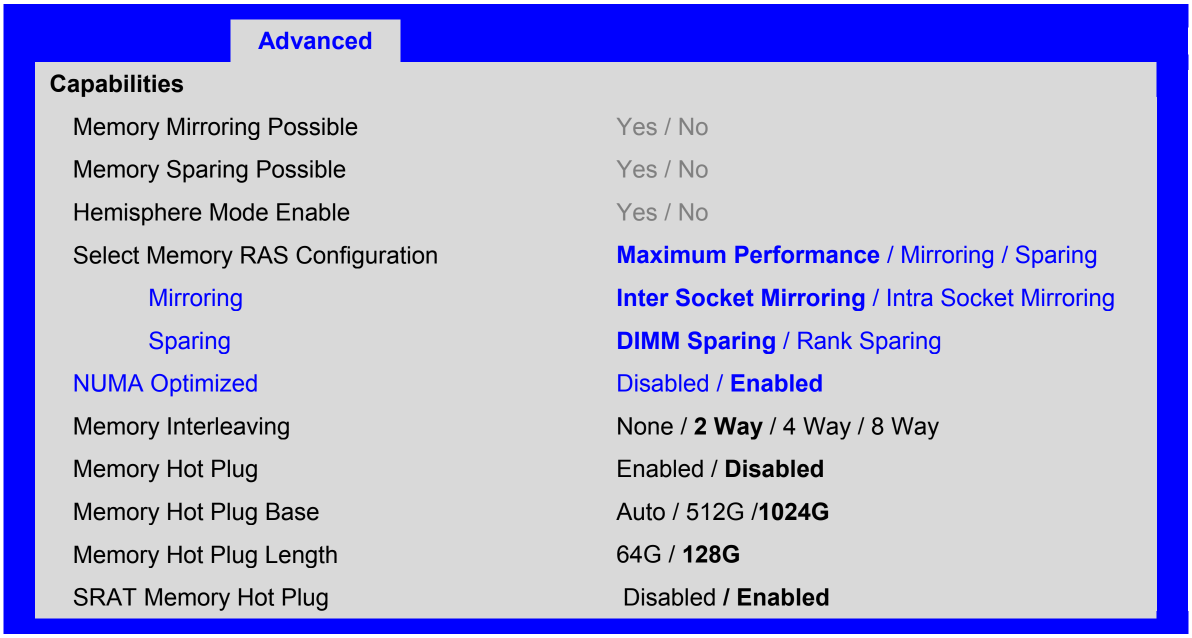
Setup Item	Options (Default in Boldface)	Help Text	Comments
Total Memory			**Information only**. The amount of memory available in the system in the form of installed DDR-3 DIMMs, in units of MB or GB.
Effective Memory			**Information only**. The amount of memory available to the OS in MB or GB. The Effective Memory is the difference between Total Physical Memory and the sum of all memory reserved for internal usage, RAS redundancy and SMRAM. This difference includes the sum of all DDR-3 DIMMs that failed Memory BIST during POST, or were disabled by the BIOS during memory discovery phase in order to optimize memory configuration.
Current Configuration	**Maximum Performance** Mirroring Sparing		**Information only**. Displays one of the following: ▪ **Max Performance Mode**: System memory is configured for max performance. ▪ **Mirror Mode**: System memory is configured for

Setup Item	Options (Default in Boldface)	Help Text	Comments
			maximum reliability in the form of memory mirroring. ▪ **Sparing Mode:** System memory is configured for RAS with optimal effective memory.
Current Memory Speed			**Information only**. Displays speed the memory is running at.
Memory RAS and Performance Configuration		Configure memory RAS (Reliability, Availability, and Serviceability) and view current memory performance information and settings.	Select to configure the memory RAS and performance. This takes the user to a different screen.

Configure Memory RAS and Performance Screen

The Configure Memory RAS and Performance screen allows you to customize several memory configuration options, such as whether to use Memory Mirroring or Memory Sparing.

To access this screen from the Main screen, select **Advanced** > **Memory Configuration** > **Memory RAS and Performance Configuration** > **Capabilities**.



Capabilities

Memory Mirroring Possible Yes / No

Memory Sparing Possible Yes / No

Hemisphere Mode Enable Yes / No

Select Memory RAS Configuration **Maximum Performance** / Mirroring / Sparing

Mirroring **Inter Socket Mirroring** / Intra Socket Mirroring

Sparing **DIMM Sparing** / Rank Sparing

NUMA Optimized Disabled / **Enabled**

Memory Interleaving None / **2 Way** / 4 Way / 8 Way

Memory Hot Plug Enabled / **Disabled**

Memory Hot Plug Base Auto / 512G /**1024G**

Memory Hot Plug Length 64G / **128G**

SRAT Memory Hot Plug Disabled **/ Enabled**

Figure 134. Setup Utility — Configure Memory RAS and Performance Screen

Table 28. Setup Utility — Configure RAS and Performance Screen Fields

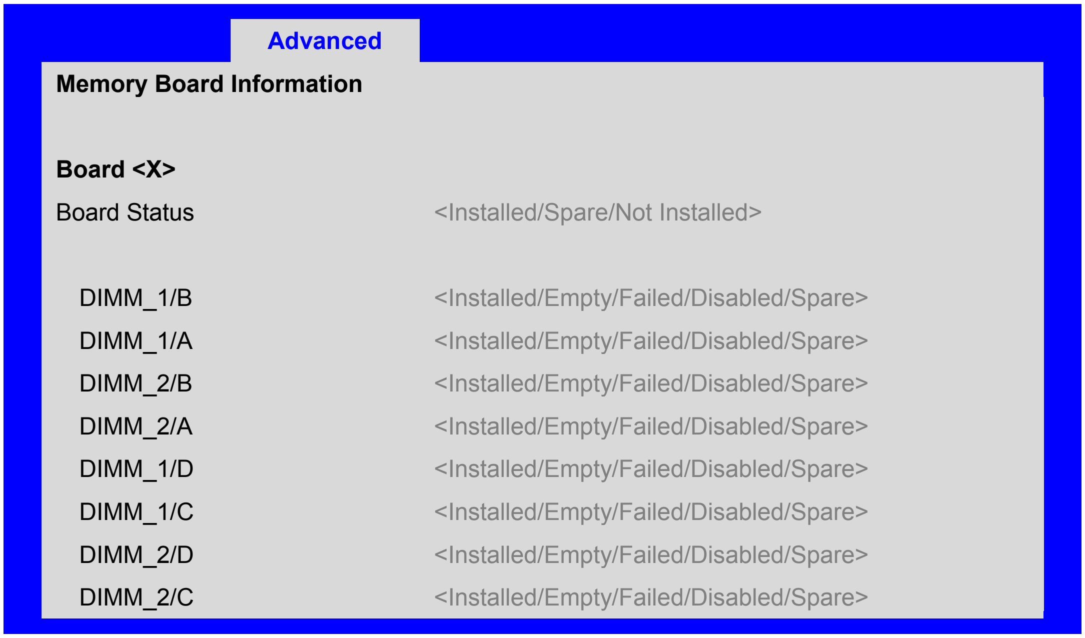
Setup Item	Options (Default in Boldface)	Help Text	Comments
Memory Mirroring Possible	Yes / No		**Information only**. Specifies if mirroring is possible.
Memory DIMM Sparing Possible	Yes / No		**Information only:** Specifies if DIMM sparing is possible.
Hemisphere Mode Enable	Yes / No		**Information only:** Specifies if DIMM sparing is possible.
Select Memory RAS Configuration	**Maximum Performance** Mirroring Sparing	Available modes depend on the current memory population. [Maximum Performance] - Optimizes system performance. [Mirroring] - Optimizes reliability by using half of physical memory as a backup. Sparing] - Improves reliability by reserving memory for use as a replacement in the event of DIMM	

		failure.”	
Mirroring Mode	**Inter-Socket Mirroring** Intra-Socket Mirroring	“Mirroring is supported across Integrated Memory Controllers where one memory riser is mirrored with another. [Inter-Socket Mirroring] - IMC is mirrored across two sockets. [Intra-Socket Mirroring] - IMC is mirrored with the other IMC in the same socket.”	Appears when Mirroring is selected in RAS configuration. And Hemisphere mode is disabled
Sparing Mode	**DIMM Sparing** Rank Sparing	Select Sparing Mode to use spare Dimm or Rank within the Integrated Memory Controller on a memory riser.	Appears when Sparing is selected in RAS configuration.
NUMA Optimized	Disabled **Enabled**	If enabled, BIOS includes ACPI tables that are required for NUMA aware Operating Systems.	
Memory Interleaving	none **2 Way** 4 Way 8 Way	Enable/Disable memory interleaving. NUMA setting is required for Memory RAS.	
Memory Hot Plug	Enabled **Disabled**	Enable/Disable Memory Hot Plug	
Memory Hot Plug Base	Auto 512G **1024G**	Set memory hot plug mapping base in system	
Memory Hot Plug Length	64G **128G**	Set memory hot plug mapping length for each board	
SRAT Memory Hot Plug	Disabled **Enabled**	“Fix for OS that does not support memory hot plug. Ex: SuSE SLES10 SP2. Enable by default. Disable will clear all hot plug bits and remove the hot plug entries in SRAT table.”	

Memory Riser Information Screens

The Memory Board Information screen allows you to view the status of each memory riser in the system.

When a DIMM fails during BIST (Early POST - MRC) all four DIMMs in the lock-step DDR3 Channel Pair will be disabled. This is due to DDR3 Channel Failure & Lock-step.



Memory Board Information

Board <X>

Board Status <Installed/Spare/Not Installed>

DIMM_1/B <Installed/Empty/Failed/Disabled/Spare>
DIMM_1/A <Installed/Empty/Failed/Disabled/Spare>
DIMM_2/B <Installed/Empty/Failed/Disabled/Spare>
DIMM_2/A <Installed/Empty/Failed/Disabled/Spare>
DIMM_1/D <Installed/Empty/Failed/Disabled/Spare>
DIMM_1/C <Installed/Empty/Failed/Disabled/Spare>
DIMM_2/D <Installed/Empty/Failed/Disabled/Spare>
DIMM_2/C <Installed/Empty/Failed/Disabled/Spare>

Figure 135. Setup Utility — Memory Riser Information Screens

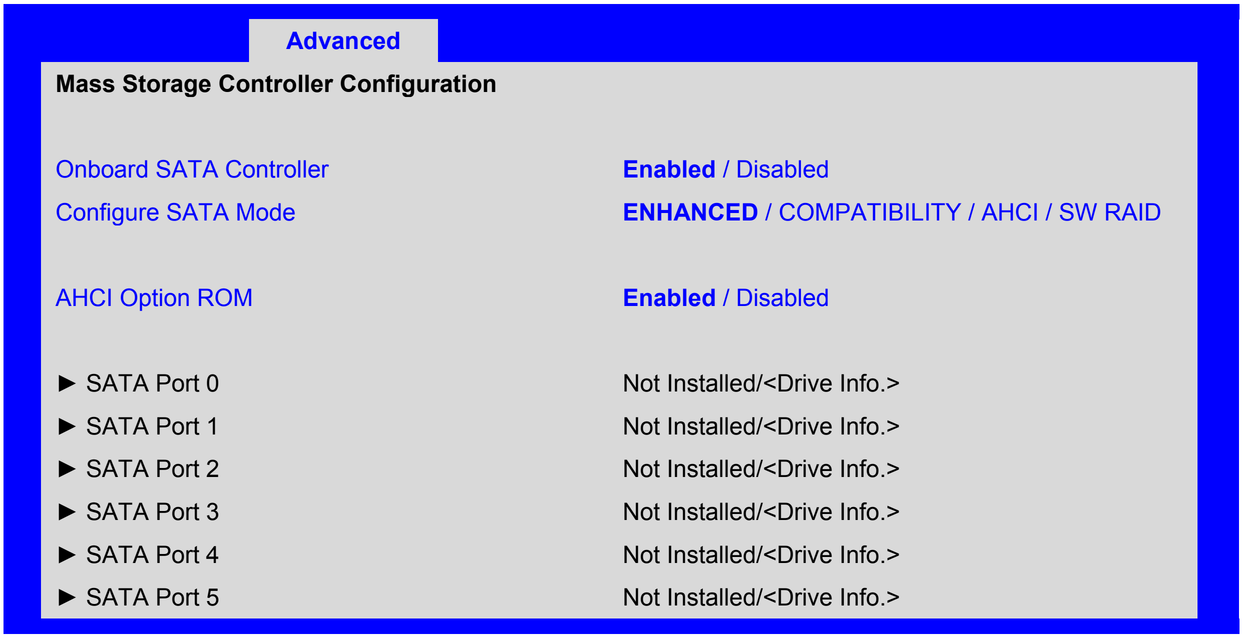
Table 29. Setup Utility — Memory Board Information Screen Fields

Setup Item	Options	Help Text	Comments
Board Status			Note: X denotes the Board ID from A-H. Indicates the status of the board.
DIMM_ XY			Displays the state of each DIMM socket present on the board. Each DIMM socket field reflects one of the following possible states: ▪ Installed: There is a DDR3DIMM installed in this slot. ▪ Not Installed: There is no DDR3 DIMM installed in this slot. ▪ Disabled: The DDR3 DIMM installed in this slot has been disabled by the BIOS in order to optimize memory configuration. ▪ Failed: The DDR3 DIMM installed in this slot is faulty / malfunctioning. ▪ Spare Unit: The DDR3 DIMM is functioning as a spare unit for memory RAS purposes. Note: X denotes the Board identifier <A-H>.

Mass Storage Controller Configuration Screen

The Mass Storage configuration screen allows you to configure the SATA/SAS controller when it is present on the baseboard, midplane or backplane of an Intel system.

To access this screen from the Main menu, select **Advanced** > **Mass Storage Controller Configuration**.



Mass Storage Controller Configuration

Onboard SATA Controller **Enabled** / Disabled

Configure SATA Mode **ENHANCED** / COMPATIBILITY / AHCI / SW RAID

AHCI Option ROM **Enabled** / Disabled

► SATA Port 0 Not Installed/<Drive Info.>

► SATA Port 1 Not Installed/<Drive Info.>

► SATA Port 2 Not Installed/<Drive Info.>

► SATA Port 3 Not Installed/<Drive Info.>

► SATA Port 4 Not Installed/<Drive Info.>

► SATA Port 5 Not Installed/<Drive Info.>

Figure 136. Setup Utility — Mass Storage Controller Configuration Screen

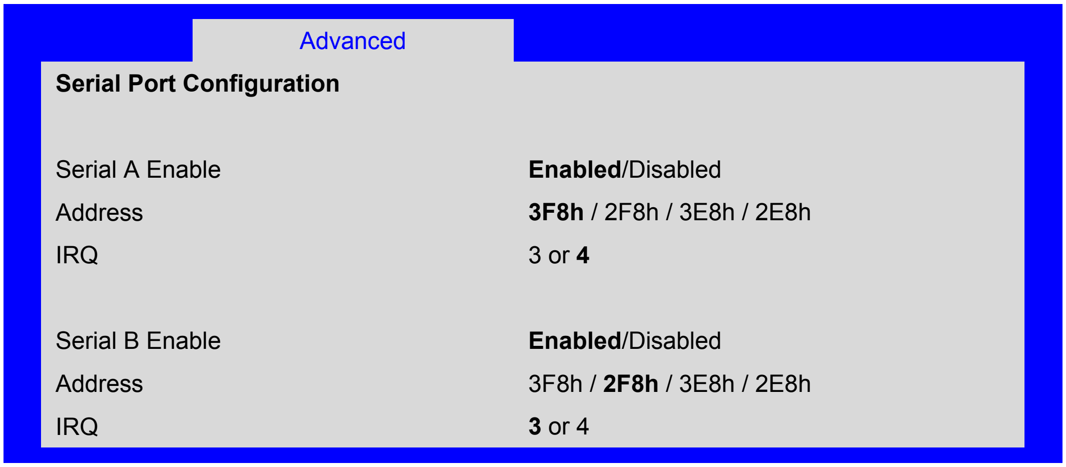
Table 30. Setup Utility — Mass Storage Controller Configuration Screen Fields

Setup Item	Options	Help Text	Comments
Onboard SATA Controller	**Enabled** Disabled	On-board Serial ATA (SATA) controller.	
SATA Mode	**ENHANCED** COMPATIBILITY AHCI SW RAID	[ENHANCED] - Supports up to six SATA ports with IDE Native Mode. [COMPATIBILITY] - Supports up to four SATA ports[0/1/2/3] with IDE Legacy mode and two SATA ports[4/5] with IDE Native Mode. [AHCI] - Supports all SATA ports using the Advanced Host Controller Interface. [SW RAID] - Supports configuration of SATA ports for RAID via RAID configuration software.	This field does not appear when the Onboard SATA Controller is disabled. Changing this setting requires a reboot before HDD boot order can be set. [SW RAID] option is unavailable when EFI Optimized Boot is enabled, since SW RAID can only be used in Legacy Boot mode.
AHCI Option ROM	**Enabled** Disabled	Enable or Disable the onboard Advanced Host Controller Interface (AHCI) option ROM. Note: For AHCI capability in EFI, the AHCI Legacy Option ROM should be set to [Disabled].	Appears on if SATA mode is selected to AHCI
SATA Port 0	< Not Installed / Drive information>		**Information only**. This field is unavailable when RAID Mode is enabled.
SATA Port 1	< Not Installed / Drive information>		**Information only**. This field is unavailable when RAID Mode is enabled.
SATA Port 2	< Not Installed / Drive information>		**Information only**. This field is unavailable when RAID Mode is enabled.
SATA Port 3	< Not Installed / Drive information>		**Information only**. This field is unavailable when RAID Mode is enabled.
SATA Port 4	< Not Installed / Drive information>		**Information only.** This field is unavailable when RAID Mode is enabled.
SATA Port 5	< Not Installed / Drive information>		**Information only**. This field is unavailable when RAID Mode is enabled.

Serial Port Configuration Screen

The Serial Ports Configuration screen allows you to configure the Serial A [COM 1] and Serial B [COM2] ports.

To access this screen from the Main screen, select **Advanced** > **Serial Port Configuration**.



Serial Port Configuration

Serial A Enable **Enabled**/Disabled
Address **3F8h** / 2F8h / 3E8h / 2E8h
IRQ 3 or **4**

Serial B Enable **Enabled**/Disabled
Address 3F8h / **2F8h** / 3E8h / 2E8h
IRQ **3** or 4

Figure 137. Setup Utility — Serial Port Configuration Screen

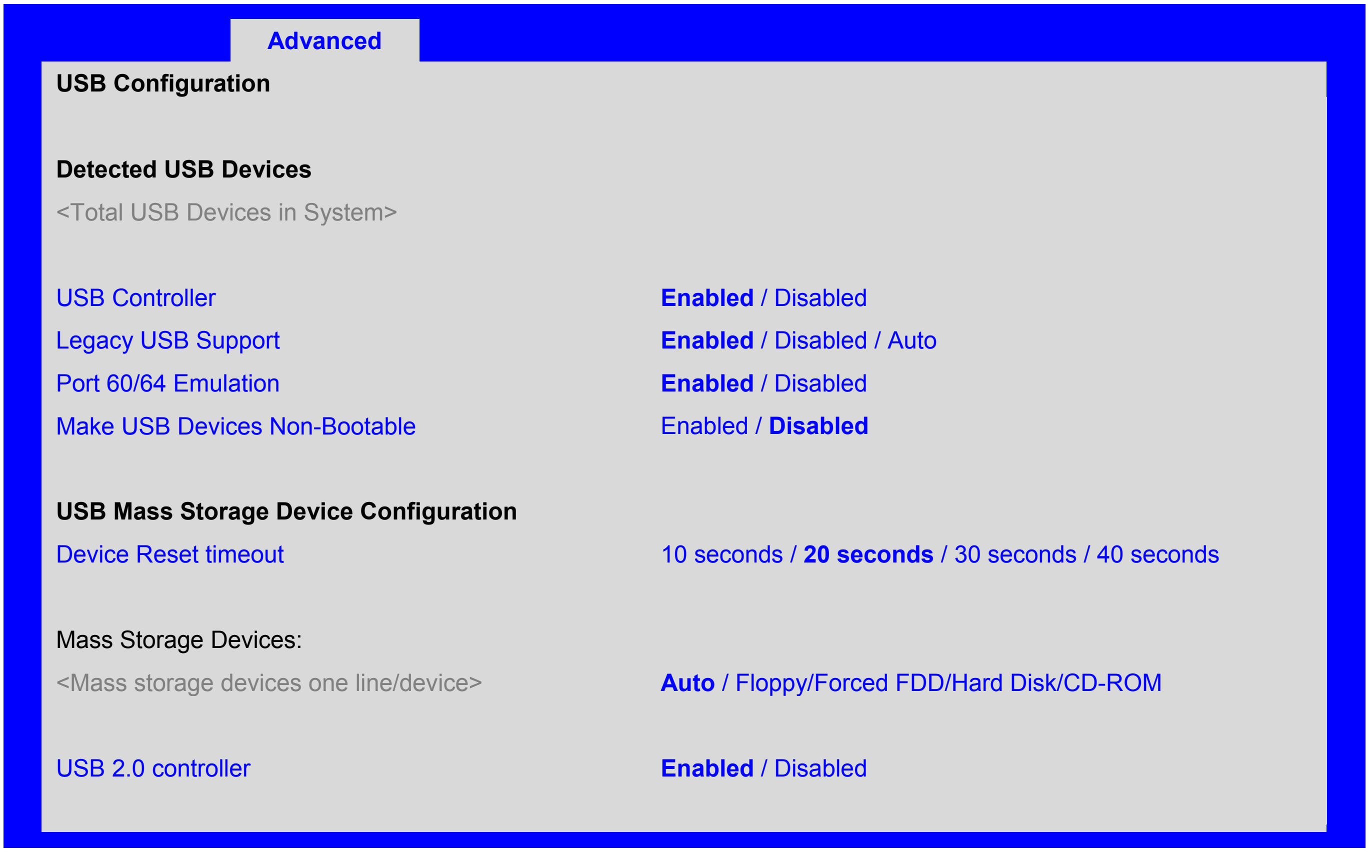
Table 31. Setup Utility — Serial Ports Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Serial A Enable	**Enabled** Disabled	Enable or Disable Serial port A.	
Address	**3F8h** 2F8h 3E8h 2E8h	Select Serial port A base I/O address.	
IRQ	3 **4**	Select Serial port A interrupt request (IRQ) line.	
Serial B Enable	**Enabled** Disabled	Enable or Disable Serial port B.	
Address	3F8h **2F8h** 3E8h 2E8h	Select Serial port B base I/O address.	
IRQ	**3** 4	Select Serial port B interrupt request (IRQ) line.	

USB Configuration Screen

The USB Configuration screen allows you to configure the USB controller options.

To access this screen from the Main screen, select **Advanced** > **USB Configuration**.



USB Configuration

Detected USB Devices

<Total USB Devices in System>

USB Controller **Enabled** / Disabled

Legacy USB Support **Enabled** / Disabled / Auto

Port 60/64 Emulation **Enabled** / Disabled

Make USB Devices Non-Bootable Enabled / **Disabled**

USB Mass Storage Device Configuration

Device Reset timeout 10 seconds / **20 seconds** / 30 seconds / 40 seconds

Mass Storage Devices:

<Mass storage devices one line/device> **Auto** / Floppy/Forced FDD/Hard Disk/CD-ROM

USB 2.0 controller **Enabled** / Disabled

Figure 138. Setup Utility — USB Configuration Screen

Table 32. Setup Utility — USB Controller Configuration Screen Fields

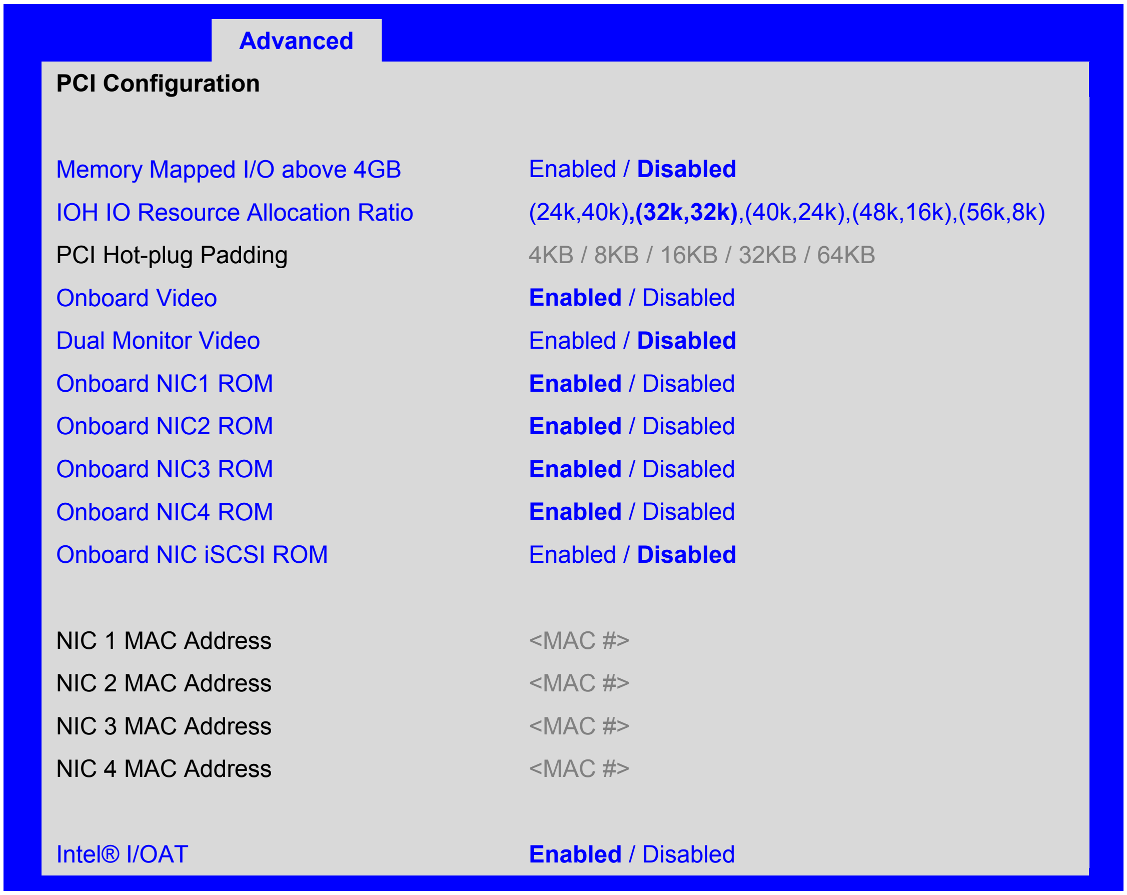
Setup Item	Options (Default in Boldface)	Help Text	Comments
Detected USB Devices			**Information only.** This field displays number of USB devices in the system.
USB Controller	**Enabled** Disabled	[Enabled] - All on-board USB controllers are turned on and accessible by the OS. [Disabled] - All on-board USB controllers are turned off and inaccessible by the OS.	
Legacy USB Support	**Enabled** Disabled Auto	USB device boot support and PS/2 emulation for USB keyboard and USB mouse devices. [Auto] - Legacy USB support is enabled if a USB device is attached.	This field is grayed out if the USB Controller is disabled.
Port 60/64 Emulation	**Enabled** Disabled	I/O port 60h/64h emulation support. **Note:** This may be needed for legacy USB keyboard support when using an OS that is USB unaware.	This field is grayed out if the USB Controller is disabled.
Make USB Devices Non- Bootable	Enabled **Disabled**	Exclude USB in Boot Table. [Enabled] - This removes all USB Mass Storage devices as Boot options. [Disabled] - This allows all USB Mass Storage devices as Boot options.	This field is grayed out if the USB Controller is disabled.
Device Reset timeout	10 sec **20 sec** 30 sec 40 sec	USB Mass Storage device Start Unit command timeout. Setting to a larger value provides more time for a mass storage device to be ready, if needed.	This field is grayed out if the USB Controller is disabled.
One line for each	**Auto**	[Auto] - USB devices less than 530 MB are emulated as floppies.	This field is hidden if no USB Mass storage

mass storage device in system	Floppy Forced FDD Hard Disk CD-ROM	[Forced FDD] - HDD formatted drive are emulated as a FDD (for example, ZIP drive).	devices are installed. This field is grayed out if the USB Controller is disabled. This setup screen can show a maximum of eight devices on this screen. If more than eight devices are installed in the system, the ‚USB Devices Enabled‘ will show the correct count, but only the first eight devices can be displayed here.
USB 2.0 controller	**Enabled** Disabled	On-board USB ports are enabled to support USB 2.0 mode. Contact your OS vendor regarding OS support of this feature.	This field is grayed out if the USB Controller is disabled.

PCI Configuration Screen

The PCI Configuration Screen allows you to configure the PCI add-in cards, onboard NIC controllers, and video options.

To access this screen from the Main screen, select **Advanced** > **PCI Configuration**.



PCI Configuration

Memory Mapped I/O above 4GB	Enabled / **Disabled**
IOH IO Resource Allocation Ratio	(24k,40k),**(32k,32k)**,(40k,24k),(48k,16k),(56k,8k)
PCI Hot-plug Padding	4KB / 8KB / 16KB / 32KB / 64KB
Onboard Video	**Enabled** / Disabled
Dual Monitor Video	Enabled / **Disabled**
Onboard NIC1 ROM	**Enabled** / Disabled
Onboard NIC2 ROM	**Enabled** / Disabled
Onboard NIC3 ROM	**Enabled** / Disabled
Onboard NIC4 ROM	**Enabled** / Disabled
Onboard NIC iSCSI ROM	Enabled / **Disabled**
NIC 1 MAC Address	<MAC #>
NIC 2 MAC Address	<MAC #>
NIC 3 MAC Address	<MAC #>
NIC 4 MAC Address	<MAC #>
Intel® I/OAT	**Enabled** / Disabled

Figure 139. Setup Utility — PCI Configuration Screen

Table 33. Setup Utility — PCI Configuration Screen Fields

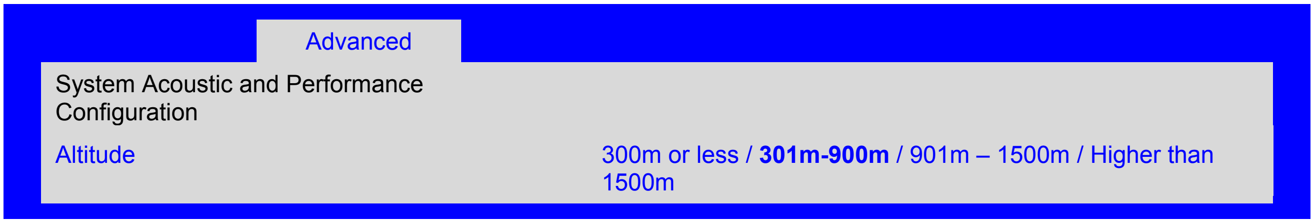
Setup Item	Options (Default in Boldface)	Help Text	Comments
Memory Mapped I/O above 4GB	Enabled **Disabled**	Enable or disable memory mapped I/O of64-bit PCI devices to 4 GB or greater address space.	
IOH IO Resource Allocation Ratio	IOH0:24k,IOH1:40k IOH0:32k,IOH1:32k IOH0:40k,IOH1:24k IOH0:48k,IOH1:16k IOH0:56k,IOH1:8k	Distribute IO resource (of total 64k) between IOH0 and IOH1 as per your system requirement.	Value of IO resource (of total 64k) between IOH0 and IOH1 will be 40k: 24k in Manufacturing Mode.

Setup Item	Options (Default in Boldface)	Help Text	Comments
PCI Hot-plug Padding	4KB 8KB 16KB 32KB **64KB**	Select the amount of space pre-initialized and reserved for PCI Express Hot-added devices.	
Onboard Video	**Enabled** Disabled	On-board video controller. **Warning:** System video is completely disabled if this option is disabled and an add-in video adapter is not installed.	When disabled, the system requires an add- in video card in order for the video to be seen.
Dual Monitor Video	Enabled **Disabled**	If enabled, both the onboard video controller and an add-in video adapter are enabled for system video. The on-board video controller becomes the primary video device.	
Onboard NIC1 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC1 cannot be used to boot or wake the system.	
Onboard NIC2 ROM	**Enabled** Disabled	If enabled. loads the embedded option ROM for the on-board network controllers. **Warning:** If [Disabled] is selected, NIC2 cannot be used to boot or wake the system.	
Onboard NIC3 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC3 cannot be used to boot or wake the system.	
Onboard NIC4 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. **Warning:** If [Disabled] is selected, NIC4 cannot be used to boot or wake the system.	
Onboard NIC iSCSI ROM	Enabled **Disabled**	If enabled, loads the embedded option ROM for the on-board network controllers. **Warning:** If [Disabled] is selected, NIC1 and NIC2 cannot be used to boot or wake the system.	This option is grayed out and not accessible if either the NIC1 or NIC2 ROMs are enabled.
NIC 1 MAC Address	No entry allowed		**Information only**. 12 hex digits of the MAC address.
NIC 2 MAC Address	No entry allowed		**Information only**. 12 hex digits of the MAC address.
NIC 3 MAC Address	No entry allowed		**Information only**. 12 hex digits of the MAC address.
NIC 4 MAC Address	No entry allowed		**Information only**. 12 hex digits of the MAC address.
Intel® I/OAT	**Enabled** Disabled	Intel® I/O Acceleration Technology (I/OAT) accelerates TCP/IP processing for onboard NICs, delivers data-movement efficiencies across the entire server platform, and minimizes system overhead.	

System Acoustic and Performance Configuration

The System Acoustic and Performance Configuration screen allows you to configure the thermal characteristics of the system.

To access this screen from the Main screen, select **Advanced** > **System Acoustic and Performance Configuration**.



System Acoustic and Performance Configuration

Altitude 300m or less / **301m-900m** / 901m – 1500m / Higher than 1500m

Figure 140. Setup Utility — System Acoustic and Performance Configuration

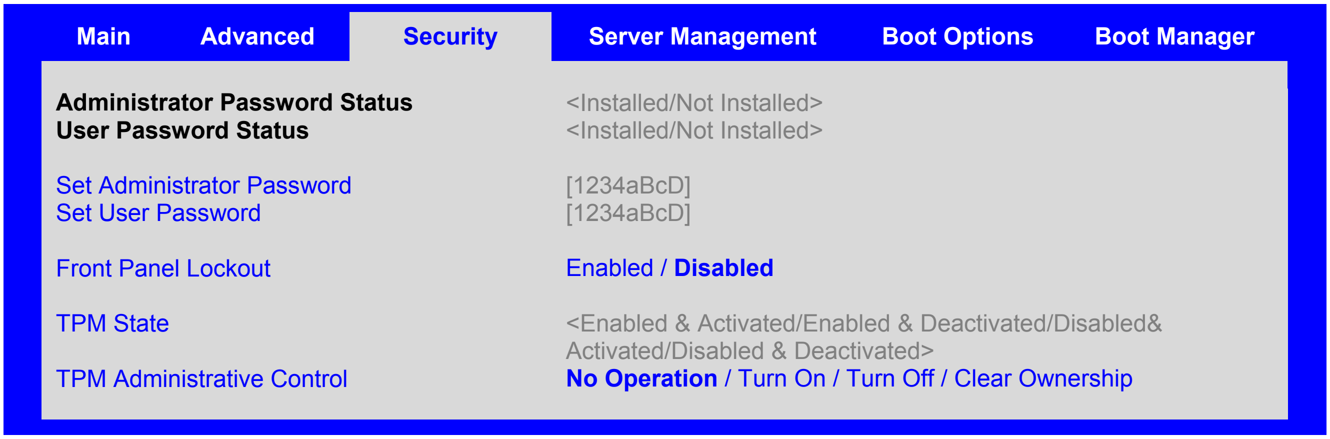
Table 34. Setup Utility — System Acoustic and Performance Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Altitude	300m or less **301m-900m** 901m-1500m Higher than 1500m	[300m or less] (980ft or less) Optimal performance setting near sea level. [301m - 900m] (980ft - 2950ft) Optimal performance setting at moderate elevation. [901m – 1500m] (2950ft – 4920ft) Optimal performance setting at high elevation. [Higher than 1500m] (4920ft or greater) Optimal performance setting at the highest elevations.	

Security Screen

The Security screen allows you to enable and set the user and administrative password. This is done to lock out the front panel buttons so they cannot be used. This screen also allows the user to enable and activate the Trusted Platform Module (TPM) security settings.

To access this screen from the Main screen, select **Security**.



Administrator Password Status <Installed/Not Installed>
User Password Status <Installed/Not Installed>

Set Administrator Password [1234aBcD]
Set User Password [1234aBcD]

Front Panel Lockout Enabled / **Disabled**

TPM State <Enabled & Activated/Enabled & Deactivated/Disabled& Activated/Disabled & Deactivated>

TPM Administrative Control **No Operation** / Turn On / Turn Off / Clear Ownership

Figure 141. Setup Utility — Security ScreenTable 35. Setup Utility — Security Configuration Screen Fields

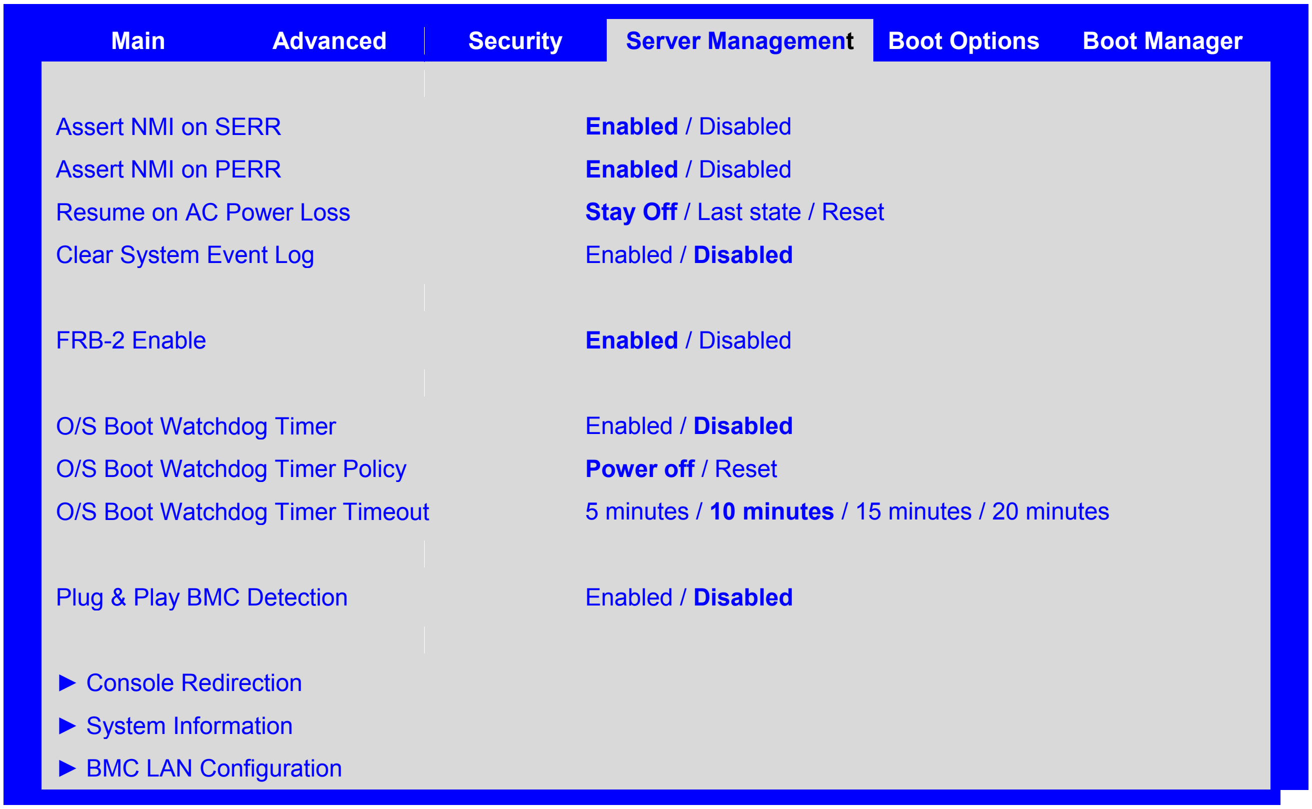
Setup Item	Options (Default in Boldface)	Help Text	Comments
Administrator Password Status	<Installed Not Installed>		**Information only**. Indicates the status of the administrator password.
User Password Status	<Installed Not Installed>		**Information only.** Indicates the status of the user password.
Set Administrator Password	[123aBcD]	Administrator password is used to control change access to the BIOS Setup Utility.	This option is only to control access to the setup. Administrator has full access to

Setup Item	Options (Default in Boldface)	Help Text	Comments
		Only alphanumeric characters can be used. Maximum length is 7 characters (case sensitive). **Note:** Administrator password must be set in order to use the user account.	all the setup items. Clearing the Administrator password also clears the user password.
Set User Password	[123aBcD]	User password is used to control entry access to BIOS Setup Utility. Only alphanumeric characters can be used. Maximum length is 7 characters. It is case sensitive. **Note:** Removing the administrator password also automatically removes the user password.	This option is available only if the administrator password is installed. This option only protects the setup. User password only has limited access to the setup items.
Front Panel Lockout	Enabled **Disabled**	If enabled, locks the power button and reset button on the system's front panel. If [Enabled] is selected, power and reset must be controlled via a system management interface.	
TPM State	Enabled and Activated Enabled and Deactivated Disabled and Activated Disabled and Deactivated		**Information only**. Shows the current TPM device state. A disabled TPM device does not execute commands that use the TPM functions and TPM security operations are not available. An enabled and deactivated TPM is in the same state as a disabled TPM except setting of the TPM ownership is allowed if not present already. An enabled and activated TPM executes all commands that use the TPM functions and TPM security operations are also available.
TPM Administrative Control	**No Operation** Turn On Turn Off Clear Ownership	[No Operation] - No changes to current state. [Turn On] - Enables and activates TPM. [Turn Off] - Disables and deactivates TPM. [Clear Ownership] - Removes the TPM ownership authentication and returns the TPM to a factory default state. **Note:** The BIOS setting returns to [No Operation] on every boot cycle by default.	

Server Management Screen

The Server Management screen allows you to configure several server management features. This screen also provides an access point to the screens for configuring console redirection and displaying system information.

To access this screen from the Main screen, select **Server Management**.



Assert NMI on SERR **Enabled** / Disabled
Assert NMI on PERR **Enabled** / Disabled
Resume on AC Power Loss **Stay Off** / Last state / Reset
Clear System Event Log Enabled / **Disabled**

FRB-2 Enable **Enabled** / Disabled

O/S Boot Watchdog Timer Enabled / **Disabled**
O/S Boot Watchdog Timer Policy **Power off** / Reset
O/S Boot Watchdog Timer Timeout 5 minutes / **10 minutes** / 15 minutes / 20 minutes

Plug & Play BMC Detection Enabled / **Disabled**

► Console Redirection
► System Information
► BMC LAN Configuration

Figure 142. Setup Utility — Server Management Screen

Table 36. Setup Utility — Server Management Configuration Screen Fields

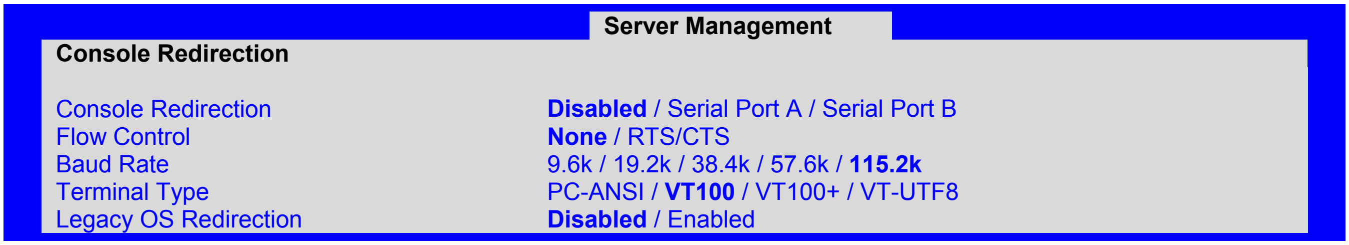
Setup Item	Options	Help Text	Comments
Assert NMI on SERR	**Enabled** Disabled	On SERR, generate an NMI and log an error. **Note:** [Enabled] must be selected for the Assert NMI on PERR setup option to be visible.	
Assert NMI on PERR	**Enabled** Disabled	On PERR, generate an NMI and log an error. **Note:** This option is only active if the Assert NMI on SERR option is [Enabled] selected.	
Resume on AC Power Loss	**Stay Off** Last state Reset	System action to take on AC power loss recovery. [Stay Off] – System stays off. [Last State] – System returns to the same state before the AC power loss. [Reset] – System powers on.	
Clear System Event Log	Enabled **Disabled**	If enabled, clears the System Event Log. All current entries will be lost. **Note:** This option is reset to [Disabled] after a reboot.	
FRB-2 Enable	**Enabled** Disabled	Fault Resilient Boot (FRB). If enabled, the BIOS programs the BMC watchdog timer for approximately 6 minutes. If the BIOS does not complete POST before the timer expires, the BMC resets the system.	
O/S Boot Watchdog Timer	Enabled **Disabled**	If enabled, the BIOS programs the watchdog timer with the timeout value selected. If the OS does not complete booting before the timer expires, the BMC resets the system and an error is logged. Requires OS support or Intel Management Software.	
O/S Boot Watchdog Timer Policy	**Power Off** Reset	If the OS boot watchdog timer is enabled, this is the system action taken if the watchdog timer expires.	Grayed out when O/S Boot Watchdog Timer is disabled.

Setup Item	Options	Help Text	Comments
		[Reset] – System performs a reset. [Power Off] – System powers off.	
O/S Boot Watchdog Timer Timeout	5 minutes **10 minutes** 15 minutes 20 minutes	If the OS watchdog timer is enabled, this is the timeout value used by the BIOS to configure the watchdog timer.	Grayed out when O/S Boot Watchdog Timer is disabled.
Plug & Play BMC Detection	Enabled **Disabled**	If enabled, the BMC is detectable by OSs that support plug and play loading of an IPMI driver. Do not enable if your OS does not support this driver.	
Console Redirection		View/Configure console redirection information and settings.	Takes the user to the Console Redirection screen.
System Information		View system information	Takes the user to the System Information screen.
BMC LAN Configuration		View/Configure BMC LAN channel and User settings.	Takes the user to the BMC configuration screen. Note: This item does not appear on some models.

Console Redirection Screen

The Console Redirection screen allows you to enable or disable console redirection and to configure the connection options for this feature.

To access this screen from the Main screen, select **Server Management** > **Console Redirection**.



Server Management

Console Redirection

Console Redirection **Disabled** / Serial Port A / Serial Port B
Flow Control **None** / RTS/CTS
Baud Rate 9.6k / 19.2k / 38.4k / 57.6k / **115.2k**
Terminal Type PC-ANSI / **VT100** / VT100+ / VT-UTF8
Legacy OS Redirection **Disabled** / Enabled

Figure 143. Setup Utility — Console Redirection Screen

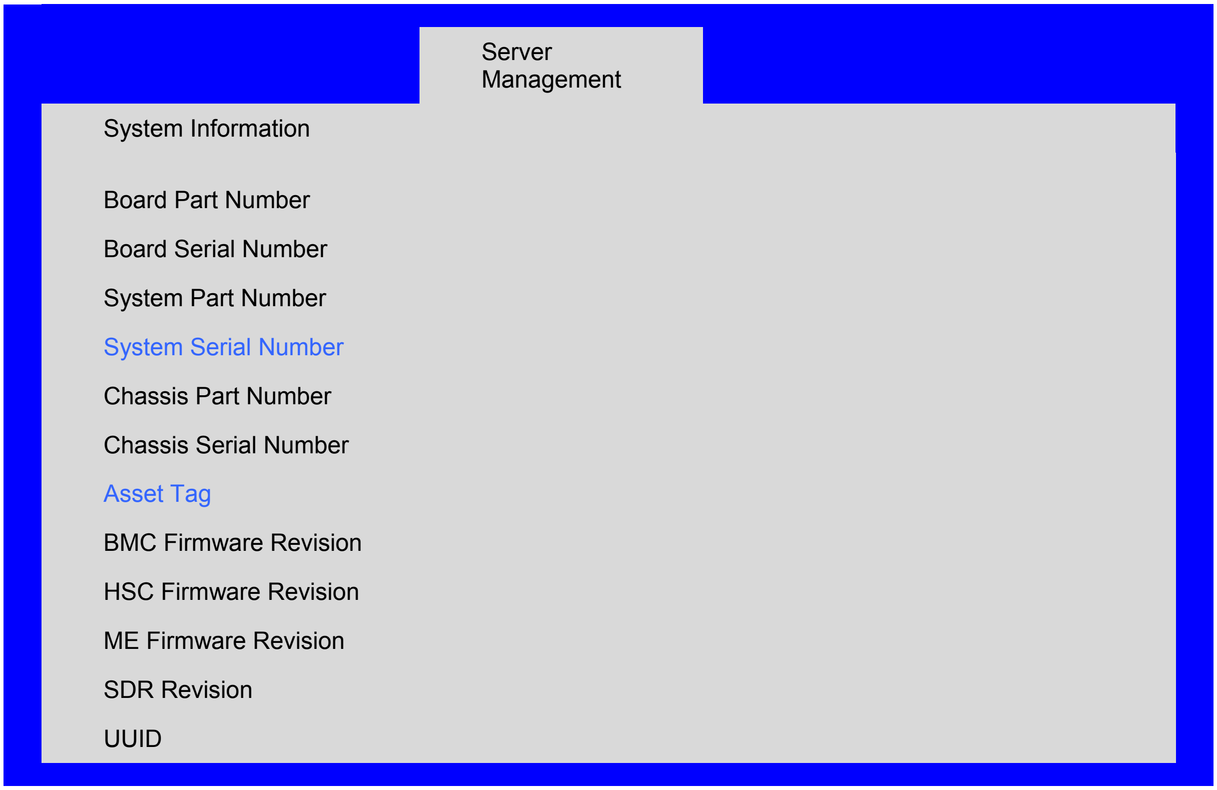
Table 37. Setup Utility — Console Redirection Configuration Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Console Redirection	**Disabled** Serial Port A Serial Port B	Console redirection allows a serial port to be used for server management tasks. [Disabled] - No console redirection. [Serial Port A] - Configure serial port A for console redirection. [Serial Port B] - Configure serial port B for console redirection. Enabling this option disables the display of the Quiet Boot logo screen during POST.	
Flow Control	**None** RTS/CTS	Flow control is the handshake protocol. Setting must match the remote terminal application. [None] - Configure for no flow control. [RTS/CTS] - Configure for hardware flow control.	
Baud Rate	9600 19.2K 38.4K 57.6K **115.2K**	Serial port transmission speed. Setting must match the remote terminal application.	
Terminal Type	PC-ANSI **VT100** VT100+ VT-UTF8	Character formatting used for console redirection. Setting must match the remote terminal application.	
Legacy OS Redirection	**Disabled** Enabled	This option enables legacy OS redirection (i.e., DOS) on serial port. If it is enabled, the associated serial port is hidden from the legacy OS.	

Server Management System Information Screen

The Server Management System Information screen allows you to view part numbers, serial numbers, and firmware revisions.

To access this screen from the Main screen, select **Server Management** > **System Information**.



Server Management

System Information

Board Part Number

Board Serial Number

System Part Number

System Serial Number

Chassis Part Number

Chassis Serial Number

Asset Tag

BMC Firmware Revision

HSC Firmware Revision

ME Firmware Revision

SDR Revision

UUID

Figure 144. Setup Utility — Server Management System Information Screen

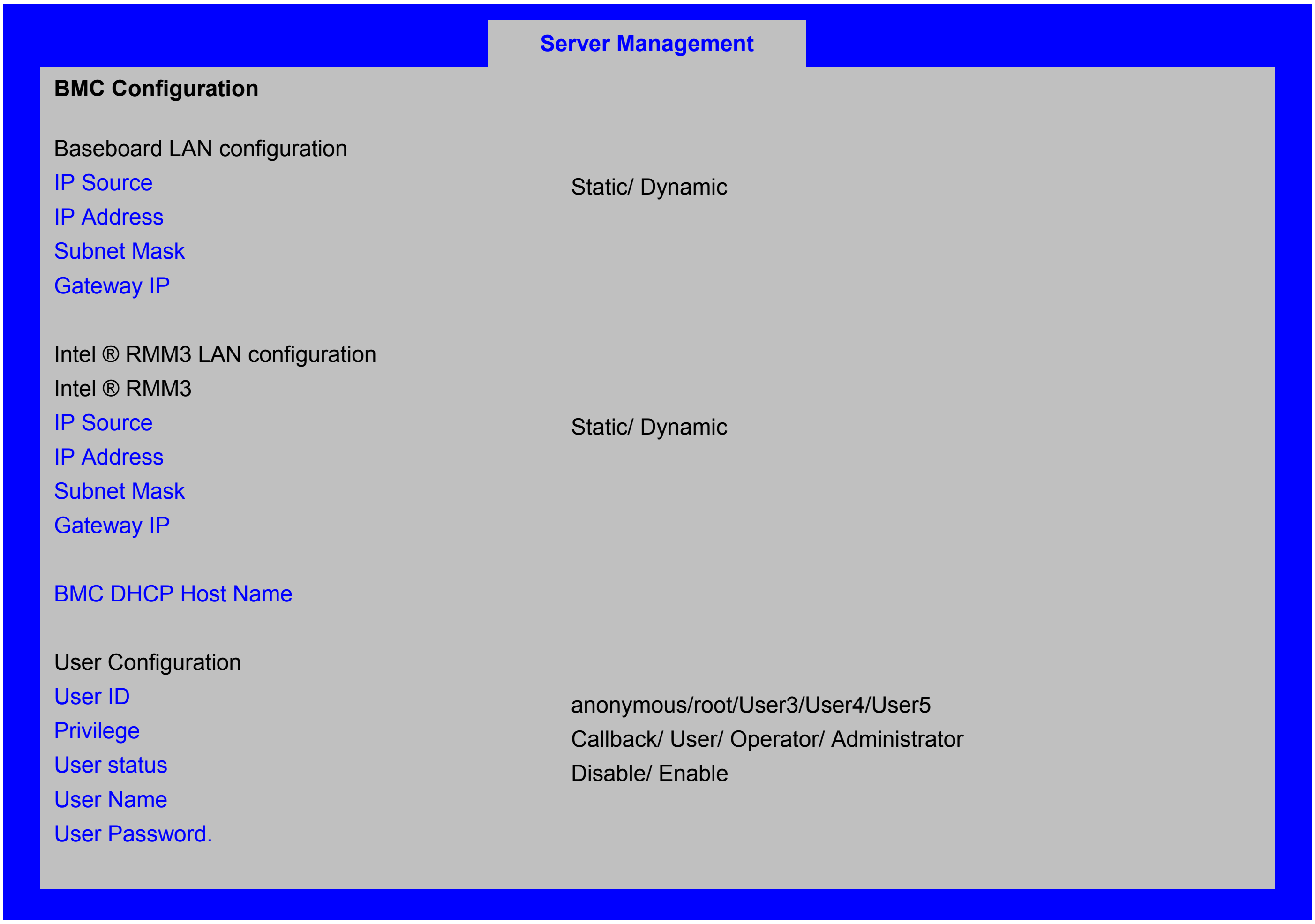
Table 38. Setup Utility — Server Management System Information Fields

Setup Item	Options	Help Text	Comments
Board Part Number			**Information only**
Board Serial Number			**Information only**
System Part Number			**Information only**
System Serial Number		Press <Enter> to edit system Serial Number. Use Backspace to delete existing value. Maximum length is 20 characters.	
Chassis Part Number			**Information only**
Chassis Serial Number			**Information only**
Asset Tag		Press <Enter> to edit system Asset Tag and then use Backspace to delete existing value. Maximum length is 20 characters.	
BMC Firmware Revision			**Information only**
HSC Firmware Revision			**Information only**
ME Firmware Revision			**Information only**
SDR Revision			**Information only**
UUID			**Information only**

BMC LAN Configuration

The BMC configuration screen allows user to configure the BMC Baseboard, RMM3 LAN channel and User settings. User can configure first five BMC user's settings.

To access this screen from the Main screen, select Server Management >BMC Configuration.



Server Management

BMC Configuration

Baseboard LAN configuration	
IP Source	Static/ Dynamic
IP Address	
Subnet Mask	
Gateway IP	
Intel ® RMM3 LAN configuration	
Intel ® RMM3	
IP Source	Static/ Dynamic
IP Address	
Subnet Mask	
Gateway IP	
BMC DHCP Host Name	
User Configuration	
User ID	anonymous/root/User3/User4/User5
Privilege	Callback/ User/ Operator/ Administrator
User status	Disable/ Enable
User Name	
User Password.	

Figure 145. Server Management - BMC Configuration

Table 39. BMC LAN Configuration Screen Fields

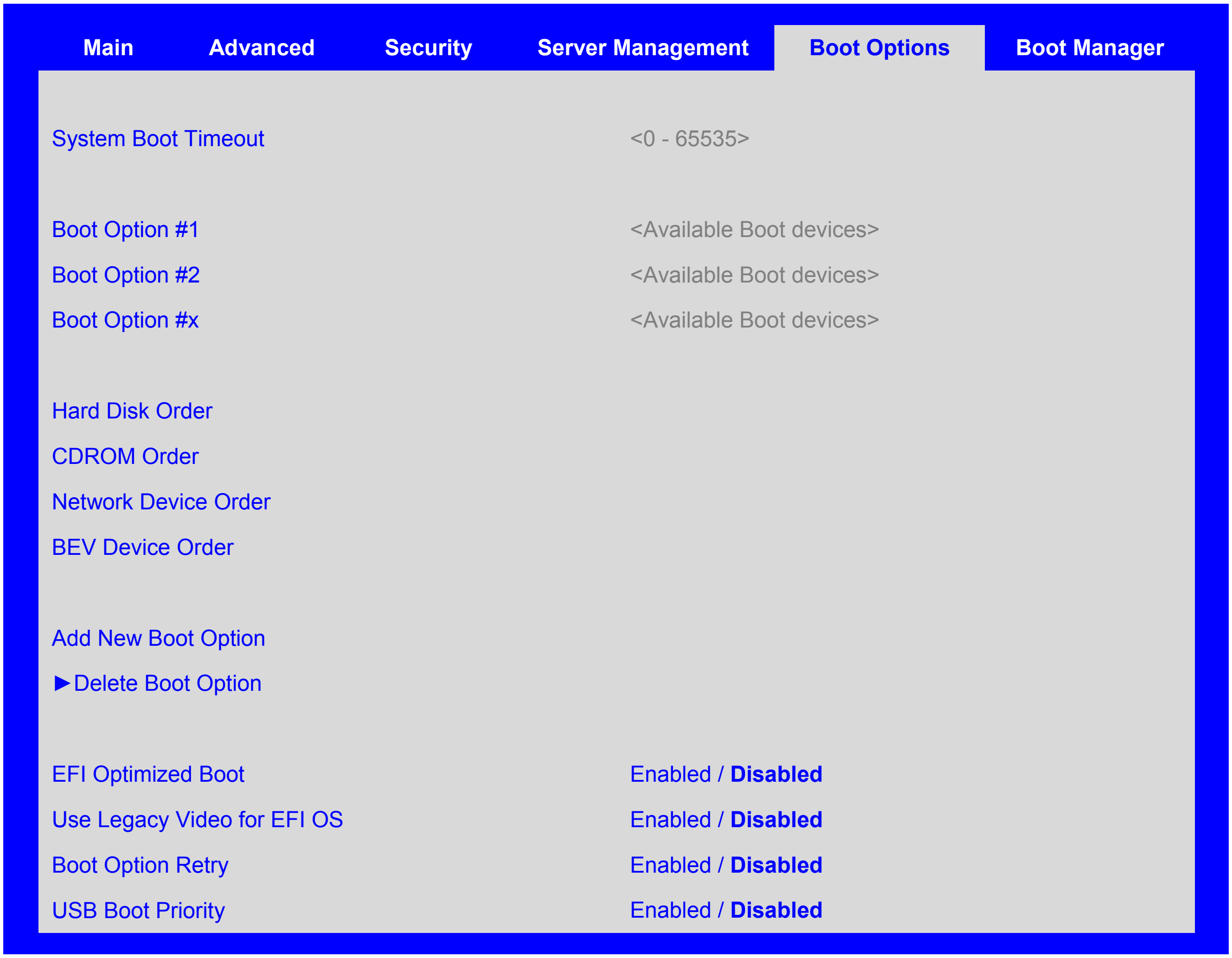
Setup Item	Options	Help Text	Comments
IP source	Static Dynamic	Select BMC IP source. When Static option is selected, IP address, subnet mask and gateway are editable. When Dynamic option selected, these fields are read-only and IP is address acquired automatically (DHCP).	
IP address		View / Edit IP address. Press <Enter> to edit.	
Subnet Mask		View / Edit subnet address. Press <Enter> to edit.	
Gateway Mask		View / Edit Gateway IP address. Press <Enter> to edit.	
Intel® RMM3			**Information only.** Display whether RMM3 present/ Not present

BMC Host Name		View / Edit BMC host name. Press <Enter> to edit.	Available only when IP source for any one channel is dynamic option.
User ID	User1 User2 User3 User4 User5	Select the user id to configure.	
Privilege	Callback User Operator Administrator	View/ Select user privilege	
User Status	Enable Disable	Enable / Disable LAN access for selected user. Also enables/disables SOL, KVM media redirection.	
User Name		Press <Enter> to edit user name. User name is string of 4 to 15 alphanumeric characters. User name must begin with an alphabetic character.	
User Password		Press <Enter> Key to enter password. Only alphanumeric characters can be used. Maximum length is 15 characters and case sensitive. **Note: Password entered will override any previously set password.	This filed will not indicate whether there is password set already.

Boot Options Screen

The Boot Options screen displays any bootable media encountered during POST, and allows you to configure desired order in which boot devices are to be tried. The first boot device in the specified boot order will be used to boot the system.

To access this screen from the Main screen, select **Boot Options**.



System Boot Timeout <0 - 65535>

Boot Option #1 <Available Boot devices>
Boot Option #2 <Available Boot devices>
Boot Option #x <Available Boot devices>

Hard Disk Order
CDROM Order
Network Device Order
BEV Device Order

Add New Boot Option
►Delete Boot Option

EFI Optimized Boot Enabled / **Disabled**
Use Legacy Video for EFI OS Enabled / **Disabled**
Boot Option Retry Enabled / **Disabled**
USB Boot Priority Enabled / **Disabled**

Figure 146. Setup Utility — Boot Options Screen

Table 40. Setup Utility — Boot Options Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Boot Timeout	**0** - 65535	The number of seconds the BIOS should pause at the end of POST to allow the user to press the [F2] key for entering the BIOS Setup utility. Valid values are 0-65535. Zero is the default. A value of 65535 causes the system to go to the Boot Manager menu and wait for user input for every system boot.	After entering the desired timeout, press the Enter key to register that timeout value to the system. These settings are in seconds.
Boot Option #x	Available boot devices.	Set system boot order by selecting the boot option for this position.	
Hard Disk Order		Set the order of the legacy devices in this group.	This field appears when 1 or more hard disk drives are in the system.
CDROM Order		Set the order of the legacy devices in this group.	This field appears when 1 or more CDROM drives are in the system.

Floppy Order		Set the order of the legacy devices in this group.	This field appears when one or more floppy drives are in the system.
Network Device Order		Set the order of the legacy devices in this group.	This field appears when 1 or more of these devices are available in the system.
BEV Device Order		Set the order of the legacy devices in this group.	This field appears when 1 or more of these devices are available in the system.
Add New Boot Option		Add a new EFI boot option to the boot order.	This option is only displayed if an EFI bootable device is available to the system, i.e., an USB drive.
Delete Boot Option		Remove an EFI boot option from the boot order.	If the EFI shell is deleted, it is restored on the next system reboot. It cannot be permanently deleted.
EFI Optimized Boot	Enabled **Disabled**	If enabled, the BIOS only loads modules required for booting EFI- aware Operating Systems.	This field is grayed out when [SW RAID] SATA Mode is Enabled. SW RAID can only be used in Legacy Boot mode.
Use Legacy Video for EFI OS	Enabled **Disabled**	If enabled, the BIOS use the legacy video ROM instead of the EFI video ROM.	This field appears only when EFI Optimized Boot is enabled.
Boot Option Retry	Enabled **Disabled**	If enabled, this continually retries non- EFI-based boot options without waiting for user input.	
USB Boot Priority	**Enabled** Disabled	If enabled, newly discovered USB devices are moved to the top of their boot device category. If disabled, newly discovered USB devices are moved to the bottom of their boot device category.	This option enables or disables the “USB Reorder” functionality. For more information.

If all types of bootable devices are installed in the system, then the default boot order is as follows:

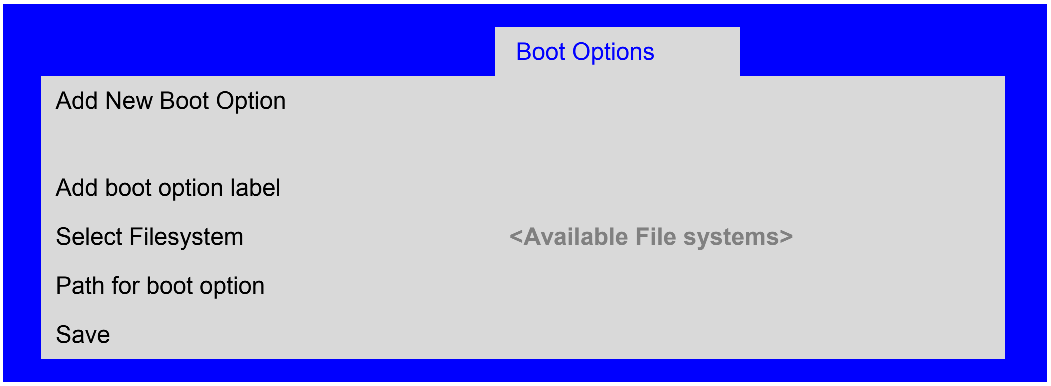
- CD/DVD-ROM
- Floppy Disk Drive
- Hard Disk Drive
- PXE Network Device
- BEV (Boot Entry Vector) Device
- EFI Shell and EFI Boot paths

To force the system to boot to EFI Shell, add the line “#FORCE_EFI_BOOT” to the beginning of the file startup.nsh.

Add New Boot Option Screen

The Add Boot Option screen allows you to add an EFI boot option from the boot order.

To access this screen from the Main screen, select **Boot Options** > **Add New Boot Option**.



Boot Options

Add New Boot Option

Add boot option label

Select Filesystem **<Available File systems>**

Path for boot option

Save

Figure 147. Setup Utility — Add New Boot Option Screen Display

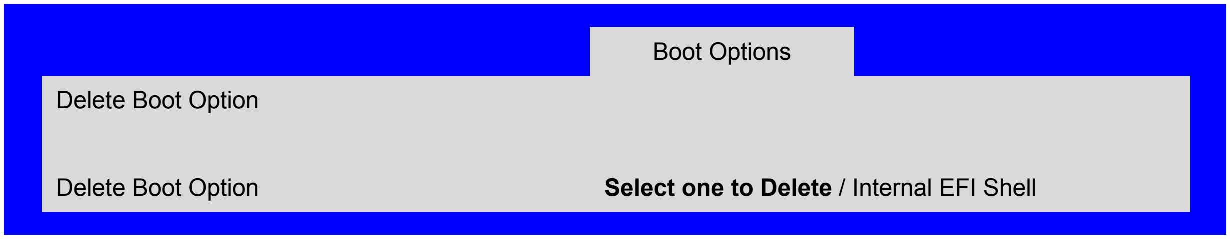
Table 41. Setup Utility — Add New Boot Option Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Add boot option label		Create the label for the new bootoption.	
Select Filesystem	Select one from the list.	Select a filesystem from the list.	
Path for boot option		Enter the path to the boot option in the format `\path\filename.efi`	
Save		Save the boot option.	

Delete Boot Option Screen

The Delete Boot Option screen allows you to remove an EFI boot option from the boot order. Note that while the Internal EFI Shell can be deleted in this screen, it is restored to the Boot Order on the next reboot. The Internal EFI Shell cannot be permanently deleted.

To access this screen from the Main screen, select **Boot Options** > **Delete Boot Options**.



Boot Options

Delete Boot Option

Delete Boot Option **Select one to Delete** / Internal EFI Shell

Figure 148. Setup Utility — Delete Boot Option Screen Display

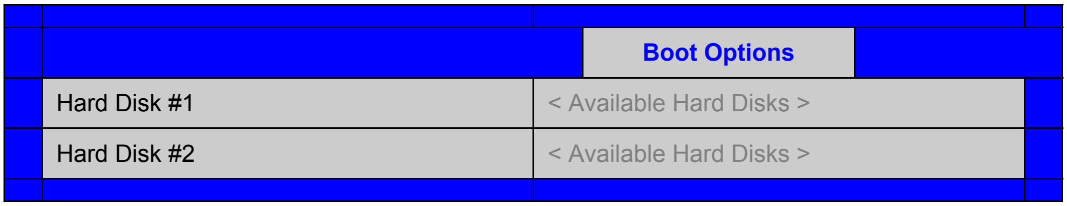
Table 42. Setup Utility — Delete Boot Option Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Delete Boot Option	Select one to Delete Internal EFI Shell	Remove an EFI boot option from the boot order.	If the EFI shell is deleted, it is restored on the next system reboot. It cannot be permanently deleted.

Hard Disk Order Screen

Figure 149. Setup Utility — Hard Disk Order Screen The Hard Disk Order screen allows you to control the hard disks.

To access this screen from the Main screen, select **Boot Options** > **Hard Disk Order**.



Boot Options

Hard Disk #1	< Available Hard Disks >
Hard Disk #2	< Available Hard Disks >

Figure 150. Setup Utility — Hard Disk Order Screen Display

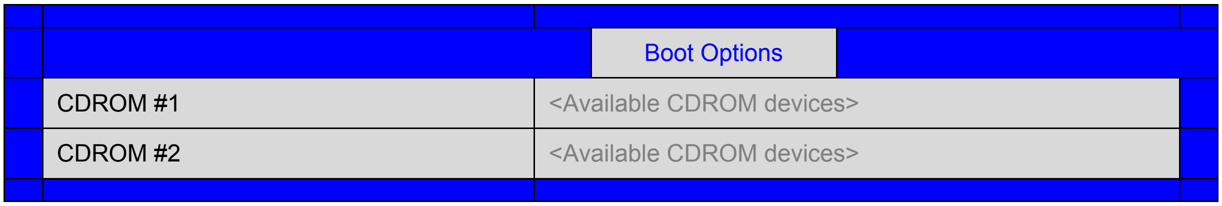
Table 43. Setup Utility — Hard Disk Order Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Hard Disk #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Hard Disk #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

CDROM Order Screen

The CDROM Order screen allows you to control the CDROM devices.

To access this screen from the Main screen, select **Boot Options** > **CDROM Order**.



Boot Options

CDROM #1	<Available CDROM devices>
CDROM #2	<Available CDROM devices>

Figure 151. Setup Utility — CDROM Order Screen

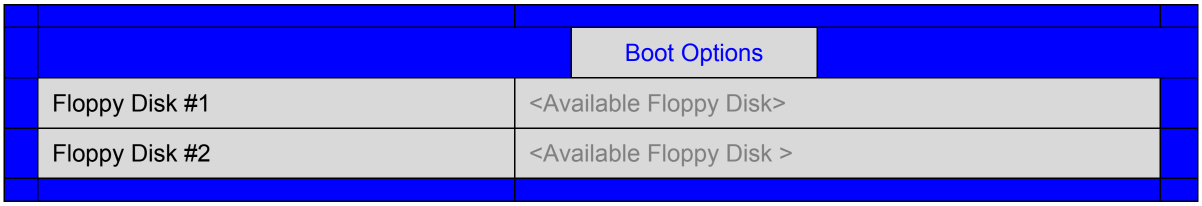
Table 44. Setup Utility — CDROM Order Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
CDROM #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
CDROM #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Floppy Order Screen

The Floppy Order screen allows you to control the floppy devices.

To access this screen from the Main screen, select **Boot Options** > **Floppy Order**.



Boot Options

Floppy Disk #1	<Available Floppy Disk>
Floppy Disk #2	<Available Floppy Disk >

Figure 152. Setup Utility — CDROM Order Screen

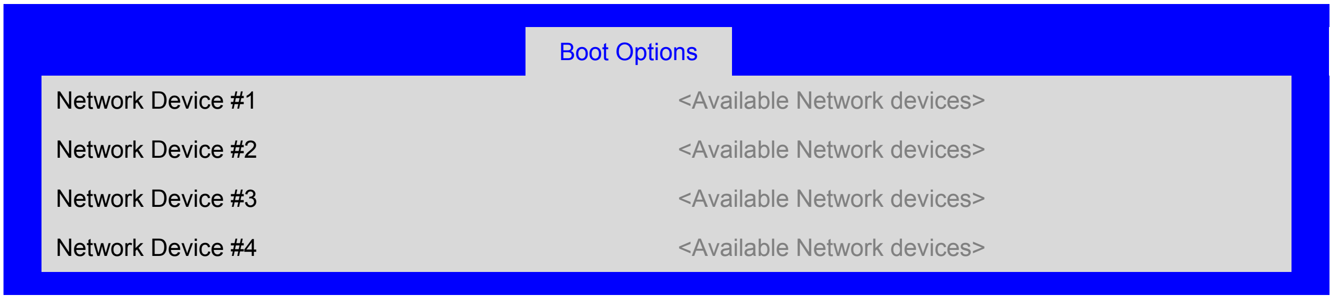
Table 45. Setup Utility — CDROM Order Fields

Setup Item	Options	Help Text	Comments
Floppy Disk #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Floppy Disk #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Network Device Order Screen

The Network Device Order screen allows you to control the network bootable devices.

To access this screen from the Main screen, select **Boot Options** > **Network Device Order**.



Boot Options

Network Device #1	<Available Network devices>
Network Device #2	<Available Network devices>
Network Device #3	<Available Network devices>
Network Device #4	<Available Network devices>

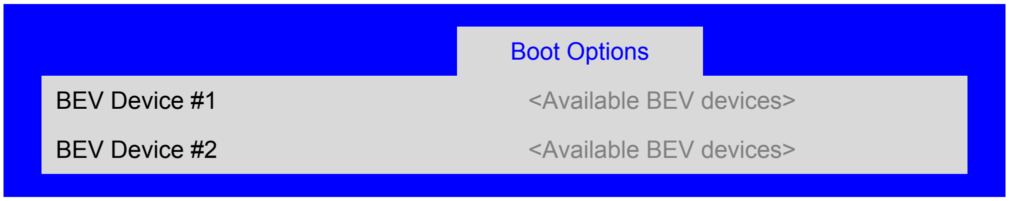
Figure 153. Setup Utility — Network Device Order ScreenTable 46. Setup Utility — Network Device Order Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Network Device #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #3	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #4	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

BEV Device Order Screen

The BEV Device Order screen allows you to control the BEV bootable devices.

To access this screen from the Main screen, select **Boot Options** > **BEV Device Order**.



BEV Device #1 <Available BEV devices>

BEV Device #2 <Available BEV devices>

Figure 154. Setup Utility — BEV Device Order Screen Display

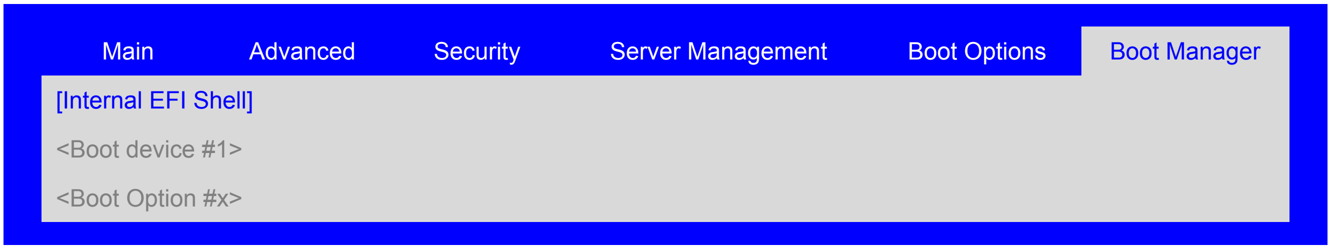
Table 47. Setup Utility — BEV Device Order Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
BEV Device #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
BEV Device #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Boot Manager Screen

The Boot Manager screen allows you to view a list of devices available for booting, and to select a boot device for immediately booting the system.

To access this screen from the Main screen, select **Boot Manager**.



[Internal EFI Shell]

<Boot device #1>

<Boot Option #x>

Figure 155. Setup Utility — Boot Manager Screen Display

Table 48. Setup Utility — Boot Manager Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Internal EFI Shell		Select this option to boot now. Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.	
Boot Device #x		Select this option to boot now. Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.	

Error Manager Screen

The Error Manager screen displays any errors encountered during POST.

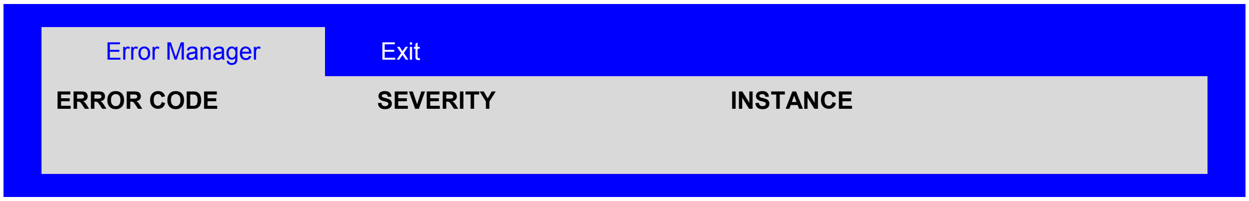

Error Manager
Exit
ERROR CODE
SEVERITY
INSTANCE

Figure 156. Setup Utility — Error Manager Screen Display

Table 49. Setup Utility — Error Manager Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Displays System Errors			**Information only**. Displays errors that occurred during the POST.

Exit Screen

The Exit screen allows you to choose whether to save or discard the configuration changes made on the other screens. It also allows you to restore the server to the factory defaults or to save or restore them to a set of user-defined default values. If Load Default Values is selected, the factory default settings (noted in bold in the tables in this chapter) are applied. If Load User Default Values is selected, the system is restored to previously saved user-defined default values.

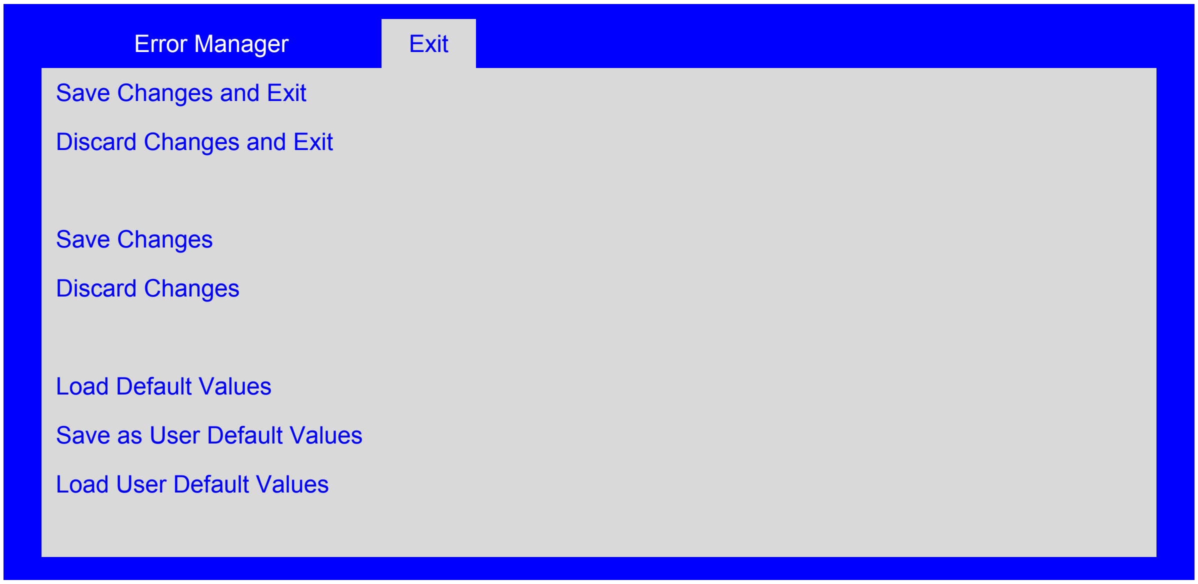

Error Manager
Exit
Save Changes and Exit
Discard Changes and Exit
Save Changes
Discard Changes
Load Default Values
Save as User Default Values
Load User Default Values

Figure 157. Setup Utility — Exit Screen Display

Table 50. Setup Utility — Exit Screen Fields

Setup Item	Help Text	Comments
Save Changes and Exit	Exit the BIOS Setup utility after saving changes. The system reboots if required. The [F10] key can also be used.	confirmation only if any of the setup fields were modified.
Discard Changes and Exit	Exit the BIOS Setup utility without saving changes. The [Esc] key can also be used.	for confirmation only if any of the setup fields were modified.

Save Changes	Save changes without exiting the BIOS Setup Utility. Note: Saved changes may require a system reboot before taking effect.	for confirmation only if any of the setup fields were modified.
Discard Changes	Discard changes made since the last Save Changes operation was performed.	for confirmation only if any of the setup fields were modified.
Load Default Values	Load factory default values for all BIOS Setup utility options. The [F9] key can also be used.	A confirmation prompt appears.
Save as User Default Values	Save current BIOS Setup utility values as custom user default values. If needed, the user default values can be restored via the Load User Default Values option below. Note: Clearing the CMOS or NVRAM does not cause the User Default values to be reset to the factory default values.	A confirmation prompt appears.
Load User Default Values	Load user default values.	A confirmation prompt appears.

Loading BIOS Defaults

Different mechanisms exist for resetting the system configuration to the default values. When a request to reset the system configuration is detected, the BIOS loads the default system configuration values during the next POST. The request to reset the system to the defaults can be sent in the following ways:

- Pressing <F9> from within the BIOS Setup utility.
- Moving the clear system configuration jumper
- Issuing an IPMI command (set System Boot options command)
- Choosing Load User Defaults from the Exit page of the BIOS Setup loads user set defaults instead of the BIOS factory defaults.

The recommended steps to load the BIOS defaults are:

1. Power down the system (Do not remove AC power).
2. Move the Clear CMOS jumper from pins 1-2 to pins 2-3.
3. Move the Clear CMOS jumper from pins 2-3 to pins 1-2.
4. Power up the system.

Clearing the BIOS Password

If the administrator password to the BIOS has been misplaced, a hardware reset may be performed to allow access to the BIOS and Operating System.

To clear the BIOS Password,

1. Power down the system.
2. Move the BIOS Recovery jumper (J6D1) from pins 1-2 to pins 2-3.
3. Move the Clear CMOS jumper from pins 2-3 to pins 1-2.
4. Power up the system.

Using the BMC (BMC Server Engine Pilot 2)

The baseboard management controller is a hardware interface powered by the ServerEngines Pilot II controller found on the I/O Riser. The baseboard management interface may be accessed through the dedicated RMM3 LAN port which provides keyboard / video / mouse (KVM) functionality. For more information about the ServerEngines Pilot II controller see the *Server Management Controller (Pilot-II) Hardware Specifications & Programmers Reference Guide*.

BMC Hardware: ServerEngines Pilot II

The BMC is provided by an embedded ARM9 controller and associated peripheral functionality that is required for IPMI-based server management. Firmware usage of these hardware features is platform dependant.

The following is a summary of the BMC management hardware features utilized by the BMC:

- 250 MHz 32-bit ARM9 Processor
- Memory Management Unit (MMU)
- Two 10/100 Ethernet Controllers with NC-SI support
- 16 bit DDR2 667 MHz interface
- Dedicated RTC
- 12 10-bit ADCs
- Eight Fan Tachometers
- Four PWMs
- Battery-backed Chassis Intrusion I/O Register
- JTAG Master
- Six I2C interfaces
- General-purpose I/O Ports (16 direct, 64 serial)

Additionally, ServerEngines* Pilot II integrates a super I/O module with the following features:

- KCS/BT Interface
- Two 16C550 Serial Ports
- Serial IRQ Support
- 12 GPIO Ports (shared with BMC)
- LPC to SPI Bridge
- SMI and PME Support

ServerEngines* Pilot II contains an integrated keyboard/video/mouse switch (KVMS) subsystem and graphics controller with the following features:

- USB 2.0 for Keyboard, Mouse, and Storage devices
- USB 1.1 interface for legacy PS/2 to USB bridging.
- Hardware Video Compression for text and graphics
- Hardware encryption
- 2D Graphics Acceleration
- DDR2 graphics memory interface
- Up to 1600x1200 pixel resolution
- PCI Express* x1 support

Appendix A: POST Codes

The system BIOS displays error messages on the video screen. Before video initialization, beep codes inform you of errors. POST error codes are logged in the event log. The BIOS displays POST error codes on the video monitor.

Eight light-emitting diodes indicate the raw binary output of port 80 values. These LEDs are arranged so you can see a direct correlation to the binary equivalent. The table shows the correlation of port 80 post code bit to LED reference designator.

Table 51. Port 80 POST Code LEDs

Port 80 POST Code Bit	LED Reference Designator
7 (MSB)	DS4E8
6	DS4E7
5	DS4E6
4	DS4E5
3	DS4E4
2	DS4E3
1	DS4E2
0 (LSB)	DS4E1

POST Progress Codes and Messages

During the system boot process, the BIOS executes several platform configuration processes, each of which is assigned a specific hex POST code number. As each configuration routine is started, the BIOS displays the POST code on the POST code diagnostic LEDs found on the back edge of the server board. To assist in troubleshooting a system hang during the POST process, the diagnostic LEDs can be used to identify the last POST process to be executed.

Table 52. POST Progress Codes and Messages

Progress Code	Progress Code Definition
Host Processor	
0x10	Power-on initialization of the host processor (Boot Strap Processor)
0x11	Host processor cache initialization (including AP)
0x12	Starting application processor initialization
0x13	SMM initialization
Chipset	
0x21	Initializing a chipset component
Memory	
0x22	Reading configuration data from memory (SPD on DIMM)
0x23	Detecting presence of memory
0x24	Programming timing parameters in the memory controller
0x25	Configuring memory parameters in the memory controller
0x26	Optimizing memory controller settings
0x27	Initializing memory, such as ECC init
0x28	Testing memory
PCIe Bus	
0x50	Enumerating PCIe buses
0x51	Allocating resources to PCIe buses

Progress Code	**Progress Code Definition**
0x52	Hot-plug PCIe controller initialization
0x53-0x57	Reserved for PCIe Bus
USB	
0x58	Resetting USB bus
0x59	Reserved for USB devices
ATA / ATAPI / SATA	
Progress Code	Progress Code Definition
0x5A	Resetting SATA bus and all devices
0x5B	Reserved for ATA
SMBUS	
0x5C	Resetting SMBUS
0x5D	Reserved for SMBUS
Local Console	
0x70	Resetting the video controller (VGA)
0x71	Disabling the video controller (VGA)
0x72	Enabling the video controller (VGA)
Remote Console	
0x78	Resetting the console controller
0x79	Disabling the console controller
0x7A	Enabling the console controller
Keyboard (only USB)	
0x90	Resetting the keyboard
0x91	Disabling the keyboard
0x92	Detecting the presence of the keyboard
0x93	Enabling the keyboard
0x94	Clearing keyboard input buffer
0x95	Instructing keyboard controller to run Self Test (PS2 only)
Mouse (only USB)	
0x98	Resetting the mouse
0x99	Detecting the mouse
0x9A	Detecting the presence of mouse
0x9B	Enabling the mouse
Fixed Media	
0xB0	Resetting fixed media device
0xB1	Disabling fixed media device
0xB2	Detecting the presence of a fixed media device (hard drive detection, etc.)
0xB3	Enabling/configuring a fixed media device
Removable Media	
0xB8	Resetting the removable media device
0xB9	Disabling the removable media device
0xBA	Detecting the presence of a removable media device (CDROM detection, etc.)
0xBC	Enabling/configuring a removable media device
Boot Device Selection	
0xDy	Trying boot selection y (where y = 0 to F)
Progress Code	Progress Code Definition
Pre-EFI Initialization (PEI) Core (not accompanied by a beep code)	
0xE0	Started dispatching early initialization modules (PEIM)

Progress Code	Progress Code Definition
0xE2	Initial memory found, configured, and installed correctly
0xE1, 0xE3	Reserved for initialization module use (PEIM)
Driver eXecution Environment (DXE) Core (not accompanied by a beep code)	
0xE4	Entered EFI driver execution phase (DXE)
0xE5	Started dispatching drivers
0xE6	Started connecting drivers
DXE Drivers (not accompanied by a beep code)	
0xE7	Waiting for user input
0xE8	Checking password
0xE9	Entering the BIOS Setup
0xEA	Flash Update
0xEE	Calling Int 19. One beep unless silent boot is enabled.
0xEF	Unrecoverable Boot failure
Runtime Phase / EFI Operating System Boot	
0xF4	Entering the sleep state
0xF5	Exiting the sleep state
0xF8	Operating system has requested EFI to close boot services ExitBootServices ( ) has been called
0xF9	Operating system has switched to virtual address mode SetVirtualAddressMap ( ) has been called
0xFA	Operating system has requested the system to reset ResetSystem () has been called
Pre-EFI Initialization Module (PEIM) / Recovery	
0x30	Crisis recovery has been initiated because of a user request
0x31	Crisis recovery has been initiated by software (corrupt flash)
0x34	Loading crisis recovery capsule
0x35	Handing off control to the crisis recovery capsule
0x3F	Unable to complete crisis recovery
Memory Error Codes (Accompanied by a beep code)	
0xE1	No Usable Memory Error: No memory in the system, or SPD bad so no memory could be detected.
0xEB	Memory Test Error: memory failed Hardware BIST.
0xED	Population Error: RDIMMs and UDIMMs cannot be mixed in the system.
0xEE	Mismatch Error: more than 2 Quad Ranked DIMMS in a channel.

POST Error Messages and Handling

The POST Error Manager displays error messages reported by the system BIOS during POST. The system BIOS truncates the 32-bit EFI POST Progress Code associated with the error to 16-bit values for display in the POST Error Manager.

The POST Error Manager behavior in response to the error is defined by the error severity reported by the BIOS. Errors are categorized in one of three severity levels. The system behavior in response to severity level of:

- Fatal

  The BIOS logs an error to the POST Error Manager.

  The BIOS logs an error message to the BMC System Event Log (SEL).

  The BIOS unconditionally enters POST Error Manager to display error message.

  The BIOS halts the system to prevent boot.

The user needs to replace the faulty part and restart the system.

- Major

  The BIOS logs an error to the POST Error Manager.

  The BIOS logs an error message to the BMC System Event Log (SEL).

  The BIOS continues booting in a degraded state by default (i.e. BIOS does not automatically enter the POST Error Manager to display the error message)

  The user can override this default behavior by configuring the BIOS Setup POST Error Pause option to Enabled. This forces the system to enter the POST Error Manager and display the error message before booting.

  The user can choose to take immediate corrective action or continue booting.

- Minor

  The BIOS logs an error to the POST Error Manager.

  The BIOS continues booting with a degraded state (i.e. BIOS does not automatically enter the POST Error Manager to display the error message).

  The user may want to replace the erroneous unit.

The POST Error Manager reports a maximum of 500 errors on any single boot cycle. Errors are automatically cleared from the Error Manager on each boot.

Table 53. POST Error Manager Messages and Handling

Error Code	Error Message	Response
0x0012	CMOS Date/Time not set.	Major
0x0048	Password check failed.	Major
0x0108	Keyboard locked error.	Minor
0x0109	Keyboard stuck key error.	Minor
0x0113	The SAS RAID firmware cannot run properly. The user should attempt to reflash the firmware.	Major
0x0140	PCIe Parity Error (PERR).	Fatal
0x0141	PCIe resource conflict error.	Major
0x0146	PCIe out of resources error.	Major
0x0192	Processor cache size mismatch detected.	Fatal
0x0193	Processor stepping mismatch.	Minor
0x0194	Processor family mismatch detected.	Fatal
0x0195	Processor Intel(R) QPI speed mismatch.	Major
0x0196	Processor model mismatch.	Fatal
0x0197	Processor speeds mismatched.	Fatal
0x0198	Processor family is not supported.	Fatal
0x019F	Processor and chipset stepping configuration is unsupported. By continuing to boot, you acknowledge you are operating in an unsupported configuration.	Major
0x5220	CMOS/NVRAM configuration cleared.	Major
0x5221	Passwords cleared by jumper.	Major
0x5224	Password Clear jumper is set.	Major
0x8120	Processor Thermal Trip error.	Major

Error Code	Error Message	Response
0x8130	Processor Disabled	Major
0x8140	Processor FRB-3 timeout.	Major
0x8160	Processor unable to apply microcode update.	Major
0x8170	Processor Built-In Self Test (BIST) failure.	Major
0x8180	Processor microcode update not found.	Minor
0x8190	Watchdog Timer failed on last boot.	Major
0x8198	OS boot watchdog timer failure.	Major
0x8300	Baseboard Management Controller failed self test.	Major
0x84F2	Baseboard Management Controller failed to respond.	Major
0x84F3	Baseboard Management Controller in Update Mode.	Major
0x84F4	Baseboard Management Controller Sensor Data Record empty.	Major
0x84FF	Baseboard Management Controller System Event Log full.	Minor
0x8604	Chipset Reclaim of non critical variables complete.	Minor
0xA000	TPM device not detected.	Major
0xA001	TPM device is missing or not responding.	Major

POST Error Beep Codes

The following table lists POST error beep codes. Prior to system video initialization, the BIOS uses beep codes to inform users about error conditions. The beep code is followed by a user visible code on POST Progress LEDs.

Table 54. Beep Codes

Beeps	Error Message	POST Progress Code	Description
3	Memory error		System halted because a fatal error related to the memory.

BMC Beep Codes

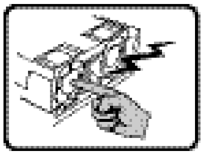
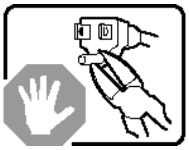
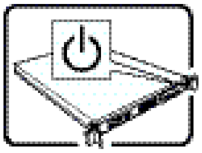
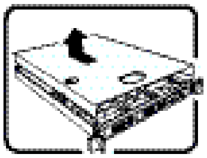
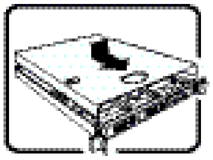
The BMC may generate beep codes upon detection of failure conditions. Beep codes are sounded each time the problem is discovered (for example, on each power-up attempt), but are not sounded continuously. supported codes are listed in Table 55. Each digit in the code is represented by a sequence of beeps whose count is equal to the digit.

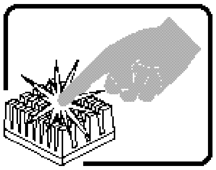
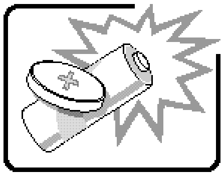
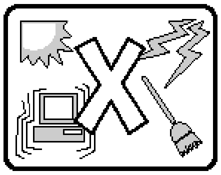
Table 55. BMC Beep Codes

Code	Reason for Beep	Associated Sensors	Supported
1-5-2-1	No CPUs installed or first CPU socket is empty.	CPU Missing Sensor	Yes
1-5-4-2	Power fault: DC power unexpectedly lost (power good dropout).	Power unit – power unit failure offset.	Yes
1-5-4-4	Power control fault (power good assertion timeout).	Power unit – soft power control failure offset.	Yes

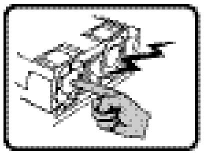
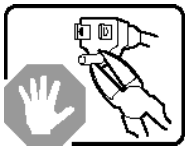
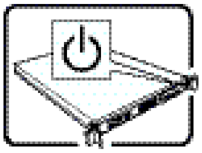
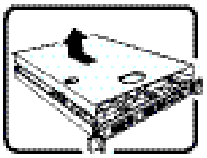
Appendix B: Installation / Assembly Safety Instructions

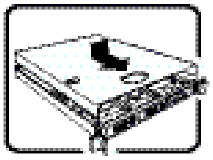
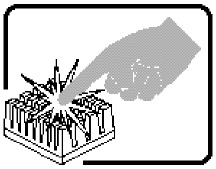
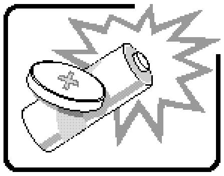
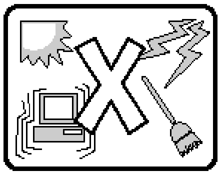
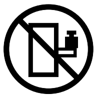
English

	The power supply in this product contains no user-serviceable parts. Refer servicing only to qualified personnel.
	Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.
	The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply. The power cord(s) is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into shall be installed near the equipment and shall be easily accessible.
	SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps: 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by pressing the power button. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system. 5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components. 6. Do not operate the system with the chassis covers removed.
	After you have completed the six SAFETY steps above, you can remove the system covers. To do this: 1. Unlock and remove the padlock from the back of the system if a padlock has been installed. 2. Remove and save all screws from the covers. 3. Remove the cover(s).
	For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers: 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in cards, and other components are properly installed. 3. Attach the covers to the chassis with the screws removed earlier,

	and tighten them firmly. 4. Insert and lock the padlock to the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord(s) to the system.
	A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
	Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to manufacturer's instructions.
	The system is designed to operate in a typical office environment. Choose a site that is: • Clean and free of airborne particles (other than normal room dust). • Well ventilated and away from sources of heat including direct sunlight. • Away from sources of vibration or physical shock. • Isolated from strong electromagnetic fields produced by electrical devices. • In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm. • Provided with a properly grounded wall outlet. • Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.
	The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.
	Heavy object. Indicates two people are required to safely handle the system.
	Leakage Current Shock Hazard. High touch current. Earth connection essential before connecting power supply.

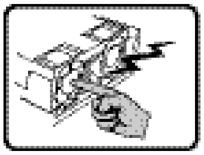
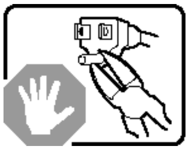
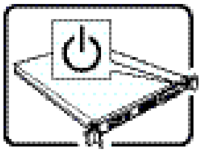
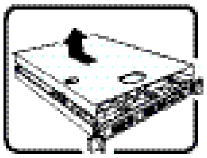
Deutsch

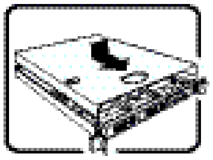
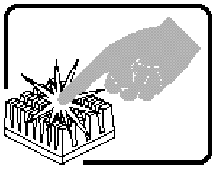
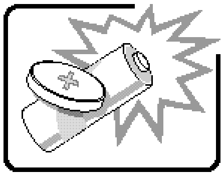
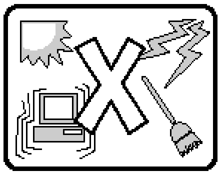
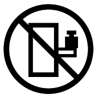
	Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.
	Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. Ein Produkt mit mehreren Netzgeräten hat für jades Netzgerät ein eigenes Netzkabel.
	Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jades Wechselstrom-Netzkabel aus der Steckdose bzw. dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.
	SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten: 1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus. 2. Schalten Sie das System mit dem Hauptschalter aus. 3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose. 4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab. 5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden. 6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.
	SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten: 1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus. 2. Schalten Sie das System mit dem Hauptschalter aus. 3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose. 4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab. 5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden. 6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.

	Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen: 1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben. 2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation. 3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an. 4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern. 5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.
	Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.
	Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.
	Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte: • sauber und staubfrei sein (Hausstaub ausgenommen); • gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung); • keinen Erschütterungen ausgesetzt sein; • keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen; • in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen; • mit einer geerdeten Wechselstromsteckdose ausgerüstet sein; • über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird
	De spoorrekken worden ontworpen om slechts het gewicht van het serversysteem te dragen. Gebruik geen op rails gemonteerd materiaal als werkruimte. Plaats geen extra lading op om het even welk op rails gemonteerd materiaal.

	Zeigt an, dass zwei Leute sicher erfordert sind, das System zu behandeln.
	Durchsickern-gegenwärtige Schlag-Gefahr. Hoher Notenstrom. Erdeanschluß wesentlich vor der Verbindung des Spg.Versorgungsteils.

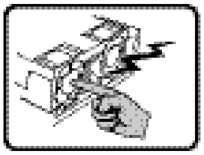
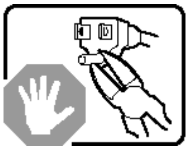
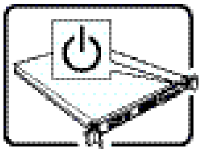
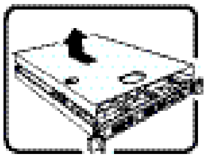
Français

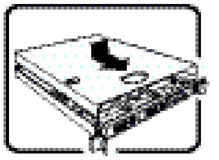
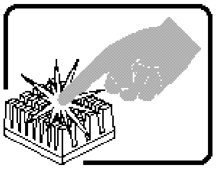
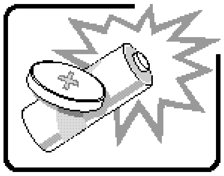
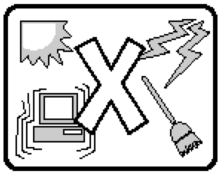
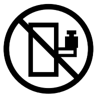
	Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.
	Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.
	Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.
	CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes: 1. Mettez hors tension tous les périphériques connectés au système. 2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir). 3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales. 4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système. 5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier). 6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.
	Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit: 1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le. 2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr. 3. Retirez les panneaux.

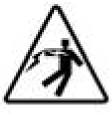
	Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit: 1. Assurez-vous de ne pas avoir oublié d'outils ou de pieces démontées dans le système. 2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés. 3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt. 4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système. 5. Rebranchez tous les cordons d'alimentation c. a. et cables externes au système.
	Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.
	Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.
	Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être: • Propre et dépourvu de poussière en suspension (sauf la poussière normale). • Bien aéré et loin des sources de chaleur, y compris du soleil direct. • A l'abri des chocs et des sources de vibrations. • Isolé de forts champs électromagnétiques géenérés par des appareils électriques. • Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage. • Muni d'une prise murale correctement mise à la terre. • Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).
	Les supports de rail sont conçus pour porter seulement le poids du système de serveur. N'utilisez pas l'équipement sur rail comme zone de travail. Ne placez aucune charge additionnelle sur aucun équipement sur rail.

	Indique que deux gens sont exigés sans accident contrôler le système.
	Risque de choc courant de fuite. High touch current. Earth connection essential before connecting power supply.

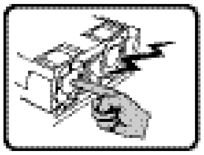
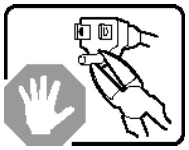
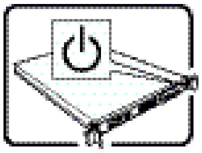
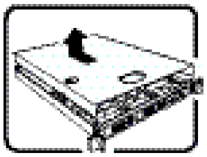
Español

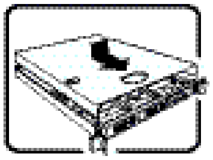
	El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación
	No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido. El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto
	Nótese que el interruptor activado / desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.
	INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones: 1. Apague todos los dispositivos periféricos conectados al sistema. 2. Apague el sistema presionando el interruptor encendido / apagado. 3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna. 4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema. 5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis - o a cualquier tipo de superficie de metal sin pintar. 6. No ponga en marcha el sistema si se han extraído las tapas del chasis.
	Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello: 1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno. 2. Extraiga y guarde todos los tornillos de las tapas. Extraiga las tapas.

	Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas: 1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema. 2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente. 3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente. 4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización. 5. Conecte todos los cables externos y los cables de alimentación CA al sistema.
	Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.
	Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.
	El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar: • Limpio y libre de partículas en suspensión (salvo el polvo normal). • Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa. • Alejado de fuentes de vibración. • Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos. • En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas. • Provisto de una toma de tierra correctamente instalada. • Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.
	Los estantes del carril se diseñan para llevar solamente el peso del sistema del servidor. No utilice el equipo montado sobre carriles como espacio de trabajo. No ponga ninguna carga adicional sobre ninguÌ n equipo montado sobre carriles.

	Indica a dos personas son requeridas a manejar sin peligro el sistema.
	Peligro de choque actual de la salida. High touch current. Conexión de tierra esencial antes de conectar la fuente de alimentación.

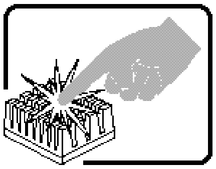
Italiano

	Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.
	Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.
	L'interruttore attivato / disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti i cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.
	PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi: 1. Spegnere tutti i dispositivi periferici collegati al sistema. 2. Spegnere il sistema, usando il pulsante spento / acceso dell'interruttore del sistema. 3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche. 4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/ O od alle prese installate sul retro del sistema. 5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema - qualsiasi superficie non dipinta - . 6. Non far operare il sistema quando il telaio è senza le coperture.
	Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque: 1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato. 2. Togliere e mettere in un posto sicuro tutte le viti delle coperture. 3. Togliere le coperture.

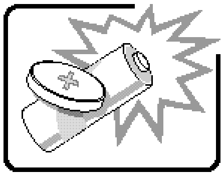


Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:

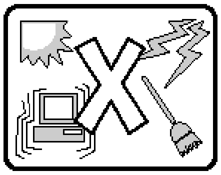
1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema.
2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente.
3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente.
4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema.
5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.



Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.

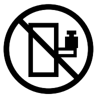


Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.



Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti di vibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.
- Dotata di spazio sufficiente ad accedere ai cavi di alimentazione, i quali rappresentano il mezzo principale di scollegamento del sistema.



Le Rail Rack sono disegnate solo per il caricamento del sistema Server stesso. Non utilizzi la superficie dell'apparecchiatura montata sulle rotaie come uno spazio di lavoro. Non metta nessun carico supplementare su nessun' apparecchiatura montata sulle rotaie.

Indica due persone sono richieste senza problemi di maneggiare il sistema.

⚠	Rischio di scossa corrente di perdita. Alta corrente di tocco. Collegamento di terra essenziale prima del collegamento dell'alimentazione elettrica.

Appendix C: Safety Information

English

Server Safety Information

To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read this document and observe all warnings and precautions in this guide before installing or maintaining your server product.

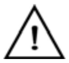
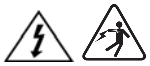
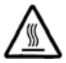
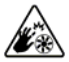
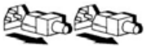
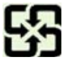
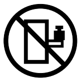
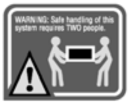
In the event of a conflict between the information in this document and information provided with the product or on the website for a particular product, the product documentation takes precedence.

Your server should be integrated and serviced only by technically qualified persons.

You must adhere to the guidelines in this guide and the assembly instructions in your server manuals to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL Listing and other regulatory approvals of the product, and may result in noncompliance with product regulations in the region(s) in which the product is sold.

Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout the documentation and may be marked on the product and / or the product packaging.

CAUTION	Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
WARNING	Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.
	Indicates potential hazard if indicated information is ignored.
	Indicates shock hazards that result in serious injury or death if safety instructions are not followed.
	Indicates hot components or surfaces.
	Indicates do not touch fan blades, may result in injury.
	Indicates to unplug all AC power cord(s) to disconnect AC power.
	Please recycle battery.
	The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.
	Indicates two people are required to safely handle the system.

Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

Site Selection

The system is designed to operate in a typical office environment. Choose a site that is:

- Clean, dry, and free of airborne particles (other than normal room dust).
- Well-ventilated and away from sources of heat including direct sunlight and radiators.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.
- Provided with either two independent AC power sources or two independent phases from a s single source. See “Power and Electrical Warnings” on page 174.

Equipment Handling Practices

Reduce the risk of personal injury or equipment damage:

- Conform to local occupational health and safety requirements when moving and lifting equipment.
- Use mechanical assistance or other suitable assistance when moving and lifting equipment.
- To reduce the weight for easier handling, remove any easily detachable components.

Power and Electrical Warnings

Caution: *The power button, indicated by the stand-by power marking, DOES NOT completely turn off the system AC power, 5V standby power is active whenever the system is plugged in. To remove power from system, you must unplug the AC power cord from the wall outlet. Your system may use more than one AC power cord. Make sure all AC power cords are unplugged. Make sure the AC power cord(s) is / are unplugged before you open the chassis, or add or remove any non hot-plug components.*

Do not attempt to modify or use an AC power cord if it is not the exact type required. A separate AC cord is required for each system power supply.

Some power supplies in servers use Neutral Pole Fusing. To avoid risk of shock use caution when working with power supplies that use Neutral Pole Fusing.

The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.

When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the server.

To avoid risk of electric shock, turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it.

Power Cord Warnings

If an AC power cord was not provided with your product, purchase one that is approved for use in your country.

Caution: *To avoid electrical shock or fire, check the power cord(s) that will be used with the product as follows:*

- *Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets.*
- *The power cord(s) must meet the following criteria:*

  The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.

  The power cord must have safety ground pin or contact that is suitable for the electrical outlet.

  The power supply cord(s) is / are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.

  The power supply cord(s) must be plugged into socket-outlet(s) that is /are provided with a suitable earth ground.

System Access Warnings

Caution: *To avoid personal injury or property damage, the following safety instructions apply whenever accessing the inside of the product:*

- *Turn off all peripheral devices connected to this product.*
- *Turn off the system by pressing the power button to off.*
- *Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.*
- *Disconnect all cables and telecommunication lines that are connected to the system.*
- *Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.*
- *Do not access the inside of the power supply. There are no serviceable parts in the power supply. Return to manufacturer for servicing.*
- *Power down the server and disconnect all power cords before adding or replacing any non hot-plug component.*
- *When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing the power supply from the server.*

Caution: *If the server has been running, any installed processor(s) and heat sink(s) may be hot.*

Unless you are adding or removing a hot-plug component, allow the system to cool before opening the covers. To avoid the possibility of coming into contact with hot component(s) during a hot-plug installation, be careful when removing or installing the hot-plug component(s).

Caution: *To avoid injury do not contact moving fan blades. If your system is supplied with a guard over the fan, do not operate the system without the fan guard in place.*

Rack Mount Warnings

Note: *The following installation guidelines are required by UL for maintaining safety compliance when installing your system into a rack.*

The equipment rack must be anchored to an unmovable support to prevent it from tipping when a server or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.

Install equipment in the rack from the bottom up, with the heaviest equipment at the bottom of the rack.

Extend only one piece of equipment from the rack at a time.

You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.

Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained.

Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Electrostatic Discharge (ESD)

Caution: *ESD can damage drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground -- any unpainted metal surface -- on your server when handling parts.*

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Other Hazards

Battery Replacement

Caution: *There is the danger of explosion if the battery is incorrectly replaced. When replacing the battery, use only the battery recommended by the equipment manufacturer.*

Dispose of batteries according to local ordinances and regulations.

Do not attempt to recharge a battery.

Do not attempt to disassemble, puncture, or otherwise damage a battery.

Cooling and Airflow

Caution: *Carefully route cables as directed to minimize airflow blockage and cooling problems. For proper cooling and airflow, operate the system only with the chassis covers installed. Operating the system without the covers in place can damage system parts. To install the covers:*

- *Check first to make sure you have not left loose tools or parts inside the system.*
- *Check that cables, add-in cards, and other components are properly installed.*
- *Attach the covers to the chassis according to the product instructions.*

Laser Peripherals or Devices

Caution: *To avoid risk of radiation exposure and / or personal injury:*

- *Do not open the enclosure of any laser peripheral or device*
- *Laser peripherals or devices have are not serviceable*
- *Return to manufacturer for servicing*

Deutsch

Sicherheitshinweise für den Server

Das vorliegende Dokument bezieht sich auf Serverplatinen, Servergehäuse (Standfuß und Rack) sowie installierte Peripheriegeräte. Es enthält Warnungen und Vorsichtsmaßnahmen zur Vermeidung von Gefahren durch Verletzung, Stromschlag, Feuer und Beschädigungen von Geräten. Lesen Sie diese Dokument daher sorgfältig, bevor Sie Ihr Serverprodukt installieren oder warten.

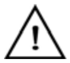
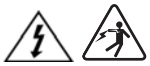
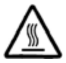
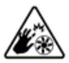
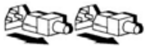
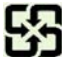
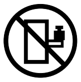
Bei Widersprüchen zwischen den hier vorliegenden Angaben und den Informationen im Lieferumfang des Produkts oder auf der Website des betreffenden Produkts hat die Produktdokumentation Vorrang.

Die Integration und Wartung des Servers darf nur durch technisch qualifizierte Personen erfolgen.

Um die Einhaltung der vorhandenen Zulassungen und Genehmigungen für das Produkt zu gewährleisten, sind die Richtlinien in diesem Handbuch sowie die Montageanleitungen in den Serverhandbüchern zu beachten. Verwenden Sie nur die beschriebenen, zugelassenen Komponenten, die im vorliegenden Handbuch angegeben werden. Die Verwendung anderer Produkte oder Komponenten führt zum Erlöschen der UL-Zulassung und anderer Genehmigungen für das Produkt. Dadurch kann das Produkt gegen Produktbestimmungen verstoßen, die im Verkaufsland gelten.

Sicherheitshinweise und Vorsichtsmaßnahmen

Um Verletzungen und Beschädigungen zu vermeiden, sollten Sie vor dem Beginn der Produktinstallation die nachfolgend aufgeführten Sicherheitshinweise und –informationen sorgfältig lesen und befolgen. In dem vorliegenden Handbuch sowie auf dem Produkt und auf der Verpackung werden folgende Sicherheitssymbole verwendet:

VORSICHT	Weist auf eine Gefahrenquelle hin, die bei Nichtbeachtung des VORSICHTSHINWEISES zu leichteren Verletzungen bzw. Sachbeschädigungen führen kann.
WARNUNG	Weist auf eine Gefahrenquelle hin, die bei Nichtbeachtung der WARNUNG zu ernsten Verletzungen führen kann.
	Weist auf potentielle Gefahr bei Nichtbeachtung der angezeigten Informationen hin.
	Weist auf die Gefahr eines Stromschlags hin, der bei Nichtbeachtung der Sicherheitshinweise zu schweren oder tödlichen Verletzungen führen kann.
	Weist auf Verbrennungsgefahr an heißen Bauteilen bzw. Oberflächen hin.
	Weist darauf hin, daß das Anfassen des Gebläses zu Verletzungen führen kann.
	Bedeutet, alle Netzkabel abzuziehen und das Gerät von der Netzspannung zu trennen.
	Bereiten Sie bitte Batterie auf
	De spoorrekken worden ontworpen om slechts het gewicht van het serversysteem te dragen. Gebruik geen op rails gemonteerd materiaal als werkruimte. Plaats geen extra lading op om het even welk op rails gemonteerd materiaal.

Zielbenutzer der Anwendung

Dieses Produkt wurde in seiner Eigenschaft als IT-Gerät getestet, das in Büros, Schulen, Computerräumen und ähnlichen öffentlichen Räumlichkeiten installiert werden kann. Die Eignung dieses Produkts für andere Einsatzbereiche als IT (z. B. Medizin, Industrie, Alarmsysteme oder Prüfgeräte) kann u. U. weitere Tests erfordern.

Standortauswahl

Das System ist für den Betrieb innerhalb normaler Büroumgebungen geeignet. Wählen Sie einen Standort, der folgenden Kriterien entspricht:

- Sauber, trocken und frei von Partikeln in der Luft (außer dem normalen Raumstaub).
- Gut belüftet, nicht in der Nähe von Wärmequellen und keiner direkten Sonnenbestrahlung ausgesetzt.
- Nicht in der Nähe von Vibrations oder Erschütterungsquellen.
- Abgeschirmt von starken elektromagnetischen Feldern, die durch elektrische Geräte erzeugt werden.
- In gewittergefährdeten Gebieten sollten Sie das System an einen Überspannungsschutz anschließen und bei einem Gewitter die Telekommunikationskabel zum Modem abziehen.
- Eine ordnungsgemäß geerdete Wandsteckdose muß vorhanden sein.
- Ausreichender Freiraum für den Zugang zu den Netzkabeln, da diese die Hauptvorrichtung zum Trennen des Produkts von der Stromversorgung sind.

Handhabung von Geräten

Beachten Sie zur Vermeidung von Verletzungen oder Beschädigungen an den Geräten die folgenden Hinweise:

- Halten Sie beim Transportieren und Anheben von Geräten die örtlichen Gesundheits und Sicherheitsvorschriften ein.
- Verwenden Sie mechanische oder andere geeignete Hilfsmittel zum Transportieren oder Anheben von Geräten.
- Entfernen Sie alle Komponenten, die sich leicht abnehmen lassen, um das Gewicht zu reduzieren und die Handhabung zu erleichtern.

Warnungen zu Netzspannung und Elektrizität

Vorsicht: *Durch Betätigen der mit dem Standby-Symbol gekennzeichneten Netztaste wird das System NICHT vollständig vom Netz getrennt. Es sind weiterhin 5 V aktiv, solange das System eingesteckt ist. Um das System vollständig vom Strom zu trennen, muß das Netzkabel aus der Steckdose abgezogen werden. Das System verfügt möglicherweise über mehrere Netzkabel. Vergewissern Sie sich in diesem Fall, daß alle Netzkabel abgezogen sind. Wenn Sie Komponenten ein- oder ausbauen möchten, die nicht hot-plug-fähig sind, stellen Sie sicher, daß zuvor alle Netzkabel abgezogen sind.*

Nehmen Sie keine Änderungen am Netzkabel vor, und verwenden Sie kein Kabel, das nicht genau dem geforderten Typ entspricht. Jedes Netzteil im System muß über ein eigenes Netzkabel angeschlossen werden.

Einige Netzteile von Intel Servern verwenden Nullleitersicherungen. Vorsicht ist geboten im Umgang mit Netzteilen, welche Nullleitersicherungen verwenden, um das Risiko eines elektrischen Schlages zu vermeiden Das Netzteil in diesem Produkt enthält keine Teile, die vom Benutzer gewartet werden können. Öffnen Sie das Netzteil nicht. Im Netzteil bestehen gefährliche Spannungen, Ströme und Energiequellen. Schicken Sie das Gerät für Wartungsarbeiten an den Hersteller zurück.

Wenn Sie ein hot-plug-fähiges Netzteil austauschen, ziehen Sie dessen Netzkabel ab, bevor Sie es aus dem Server ausbauen.

Zur Vermeidung von Stromschlägen schalten Sie den Server aus, und trennen Sie vor dem Öffnen des Geräts das Netzkabel sowie alle an den Server angeschlossene Telekommunikationssysteme, Netzwerke und Modems.

Hinweis für Netzkabel

Wenn kein Netzkabel mit dem Produkt geliefert wurde, kaufen Sie ein Kabel, das für die

***Vorsicht:** Prüfen Sie zur Vermeidung von Stromschlag- oder Feuergefahr die mit dem Produkt zu verwendenden Netzkabel wie folgt:*

- *Nehmen Sie keine Änderungen an einem Netzkabel vor, und benutzen sie es nicht, wenn es nicht genau in die geerdeten Netzsteckdosen paßt.*
- *Netzkabel müssen die folgenden Anforderungen erfüllen:*
- *Die Nennbelastbarkeit des Netzkabels muß mindestens so hoch sein wie die am Produkt angegebenen Nennstromaufnahme.*
- *Das Netzkabel muß einen zur Netzsteckdose passenden Schutzkontakt besitzen.*
- *Die Netzkabel sind die Hauptvorrichtung zum Trennen des Geräts vom Stromnetz.*
- *Die Steckdose muß in der Nähe der Anlage angebracht und gut erreichbar sein.*
- *Netzkabel müssen an eine ordnungsgemäß geerdete Steckdose angeschlossen sein.*

Warnhinweise für den Systemzugang

***Vorsicht:** Um Verletzungen und Beschädigungen zu vermeiden, sollten Sie vor Arbeiten im Produktinneren folgende Sicherheitsanweisungen beachten:*

- *Schalten Sie alle am Produkt angeschlossenen Peripheriegeräte aus.*
- *Schalten Sie das System mit dem Netzschalter aus.*
- *Trennen Sie das Gerät von der Stromquelle, indem Sie alle Netzkabel vom System bzw. aus der Steckdose ziehen.*
- *Ziehen Sie alle Kabel und alle an das System angeschlossenen Telekommunikationsleitungen ab.*
- *Bewahren Sie alle Schrauben und anderen Befestigungselemente gut auf, nachdem Sie die Gehäuseabdeckung entfernt haben. Wenn Sie Ihre Arbeiten im Systeminneren beendet haben, befestigen Sie die Gehäuseabdeckung mit den Originalschrauben bzw. -befestigungselementen.*
- *Führen Sie keine Arbeiten im Netzteil aus.Das Netzteil enthält keine für den Benutzer wartungsbedürftigen Teile. Schicken Sie das Gerät für Wartungsarbeiten an den Hersteller zurück.*
- *Schalten Sie den Server aus, und ziehen Sie alle Netzkabel ab, bevor Sie Komponenten ein- oder ausbauen, die nicht hot-plug-fähig sind.*
- *Wenn Sie ein hot-plug-fähiges Netzteil austauschen, ziehen Sie dessen Netzkabel ab, bevor Sie es aus dem Server ausbauen.*

***Vorsicht:** War Ihr Server in Betrieb, können die installierten Prozessoren und Kühlkörper heiß sein. Sofern Sie keine Hot-Plug-Komponenten ein- oder ausbauen, warten Sie mit dem Abnehmen der Abdeckungen, bis das System abgekühlt ist. Gehen Sie beim Aus- oder 178 Einbauen von Hot-Plug-Komponenten sorgfältig vor, um nicht mit heißen Komponenten in Berührung zu kommen.*

***Vorsicht:** Berühren Sie nicht die rotierenden Lüfterflügel, um Verletzungen zu vermeiden. Falls Ihr System mit eine Lüfterabdeckung besitzt, darf es nicht ohne diese Abdeckung betrieben werden.*

Warnhinweise für Racks

Das Geräte-Rack muß auf einer geeigneten, festen Unterlage verankert werden, um ein Umkippen zu vermeiden, wenn ein Server oder andere Geräte herausgezogen werden. Bei der Installation des Racks müssen die Anweisungen des Rack-Herstellers beachtet werden.

Gehen Sie bei der Installation von Geräten im Rack immer von unten nach oben vor, und bauen Sie das schwerste Gerät an der untersten Position im Rack ein.

Ziehen Sie jeweils immer nur ein Gerät aus dem Rack heraus.

Sie müssen für die gesamte Rack-Einheit einen Netztrennschalter einrichten. Dieser Netztrennschalter muß leicht zugänglich sein und über eine Kennzeichnung verfügen, die besagt, daß er die Stromzufuhr zur gesamten Einheit steuert und nicht nur zu den Servern.

Zur Vermeidung von Stromschlaggefahr müssen das Rack selbst und alle darin eingebauten Geräte ordnungsgemäß geerdet sein.

Elektrostatische Entladungen (ESD)

Vorsicht: *Elektrostatische Entladungen können zur Beschädigung von Festplatten, Platinen und anderen Komponenten führen. Daher sollten Sie alle Arbeiten an einer ESD-Workstation ausführen. Steht ein solcher Arbeitsplatz nicht zur Verfügung, erzielen Sie einen gewissen Schutz vor elektrostatischen Entladungen durch Tragen einer Antistatik-Manschette, die Sie während der Arbeit zur Erdung an einem beliebigen unlackierten Metallteil des Computergehäuses befestigen.*

Gehen Sei bei der Handhabung von Platinen immer mit größter Vorsicht vor. Sie können äußerst empfindlich gegenüber elektrostatischer Entladung sein. Halten Sie Platinen nur an den Kanten fest. Legen Sie die Platinen nach dem Auspacken aus der Schutzhülle oder nach dem Ausbau aus dem Server mit der Bauelementseite nach oben auf eine geerdete, statisch entladene Unterlage.Verwenden Sie dazu, sofern verfügbar, eine leitfahige Schaumstoffunterlage, aber niche die Schutzhülle der Platine. Ziehen Sie die Platine nicht über eine Fläche.

Andere Gefahren

Batterieaustausch

Vorsicht: *Wird die Batterie unsachgemäß ausgetauscht, besteht Explosionsgefahr. Verwenden Sie als Ersatz nur die vom Gerätehersteller empfohlene Batterie.*

Beachten Sie bei der Entsorgung von Batterien die gültigen Bestimmungen.

Versuchen Sie nicht, eine Batterie aufzuladen.

Versuchen Sie nicht, eine Batterie zu öffnen oder sonstwie zu beschädigen.

Kühlung und Luftstrom

Vorsicht: *Verlegen Sie Kabel sorgfältig entsprechend der Anleitung, um Störungen des Luftstroms und Kühlungsprobleme zu vermeiden.*

Zur Gewährleistung des ordnungsgemäßen Kühlungs- und Luftstromverhaltens darf das System nur mit angebrachten Gehäuseabdeckungen betrieben werden. Die Inbetriebnahme des Systems ohne Abdeckung kann zur Beschädigung von Systemkomponenten führen. So bringen Sie die Abdeckung wieder an:

- *Vergewissern Sie sich zunächst, daß Sie keine Werkzeuge oder Teile im Gehäuse vergessen haben.*
- *Prüfen Sie, ob Kabel, Erweiterungskarten sowie weitere Komponenten ordnungsgemäß angebracht sind.*
- *Befestigen Sie die Abdeckungen am Gehäuse des Produkts, wie in dessen Anleitung beschrieben.*

Laser-Peripheriegeräte oder -Komponenten

Vorsicht: *Beachten Sie zur Vermeidung von Strahlung und Verletzungen die folgenden Hinweise:*

- *Öffnen Sie keinesfalls das Gehäuse von Laser-Peripheriegeräten oder Laser- Komponenten.*
- *Laser-Peripheriegeräte oder -Komponenten besitzen keine für den Benutzer wartungsbedürftigen Teile.*
- *Schicken Sie das Gerät für Wartungsarbeiten an den Hersteller zurück.*

Français

Consignes de sécurité sur le serveur

Ce document s'applique aux cartes serveur, au châssis de serveur (sur pieds et sur rack) et aux périphériques installés. Pour réduire les risques de dommages corporels, d'électrocution, d'incendie et de dommages matériels, lisez ce document et respectez tous les avertissements et précautions mentionnés dans ce guide avant d'installer ou de mettre à jour votre produit serveur.

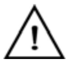
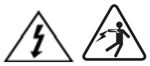
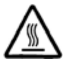
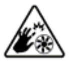
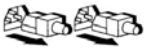
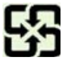
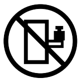
En cas de conflit entre les informations fournies dans ce document et celles livrées avec le produit ou publiées sur le site Web pour un produit particulier, la documentation du produit prime.

Votre serveur doit être intégré et entretenu uniquement par des techniciens qualifiés.

Vous devez suivre les informations de ce guide et les instructions d’assemblage des manuels de serveur pour vérifier et maintenir la conformité avec les certifications et approbations de produit existantes. Utilisez uniquement les composants décrits et réglementés spécifiés dans ce guide. L’utilisation d’autres produits / composants annulera la liste UL et les autres approbations réglementaires du produit, et le produit peut ne pas être conforme aux autres lois et réglementations locales applicables au produit.

Sécurité: avertissements et mises en garde

Pour éviter de vous blesser ou d’endommager votre équipement, lisez et respectez toutes les informations et consignes de sécurité avant de commencer l’installation du produit. Les symboles de sécurité suivants peuvent être utilisés tout au long de cette documentation et peuvent figurer sur le produit ou sur son emballage.

ATTENTION	Indique la présence d’un risque pouvant entraîner des blessures physiquesmineures ou endommager légèrement le matériel si la mise en garde n’est pas prise en compte.
AVERTISSEMENT	Indique la présence d’un risque pouvant entraîner des blessures corporelles graves si l’avertissement n’est pas pris en compte.
	Indique un risque potentiel si les informations signalées ne sont pas prises en compte.
	Indique des risques d’électrocution pouvant entraîner des blessures corporelles graves ou mortelles si les consignes de sécurité ne sont pas respectées.
	Signale des composants ou des surfaces soumis à des températures élevées.
	Indique de ne pas toucher aux pales de ventilateur, car cela peut entraîner des blessures.
	Indique de débrancher tous les cordons d’alimentation secteur pour déconnecter l’alimentation.
	Veuillez réutiliser la batterie.
	Les supports de rail sont conçus pour porter seulement le poids du système de serveur. N'utilisez pas l'équipement sur rail comme zone de travail. Ne placez aucune charge additionnelle sur aucun équipement sur rail.

Domaines d’utilisation prévus

Ce produit a été testé comme équipement informatique (ITE) et peut être installé dans des bureaux, des écoles, des salles informatiques et des endroits commerciaux similaires. L’utilisation du présent produit dans des catégories et environnements de produits et domaines d’application (par exemple, le domaine médical, industriel, résidentiel, les systèmes d’alarme et les appareils de contrôle) autres qu’ITE doit faire l’objet d’évaluations supplémentaires.

Sélection d’un emplacement

Le système est conçu pour fonctionner dans un environnement standard de bureau. Choisissez un emplacement respectant les conditions suivantes :

- Propre, sec et exempt de particules en suspension (autres que la poussière normale d’une pièce).
- Bien ventilé et à l’écart des sources de chaleur telles que la lumière directe du soleil et les radiateurs.

- À l’écart des sources de vibration ou des chocs physiques.
- Isolé des champs électromagnétiques importants produits par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques, nous vous recommandons de brancher votre système à un suppresseur de surtension et de déconnecter les lignes de télécommunication de votre modem pendant les orages.
- Équipé d’une prise murale reliée à la terre.
- Équipé d’un espace suffisant pour accéder aux cordons d’alimentation secteur, car ils servent de disjoncteur principal d’alimentation du produit.

Pratiques de manipulation de l’équipement

Réduisez le risque de dommages personnels ou matériels :

- Conformez-vous aux exigences de médecine du travail et de sécurité lorsque vous déplacez et soulevez le matériel.
- Utilisez l’assistance mécanique ou toute autre assistance appropriée lorsque vous déplacez et soulevez le matériel.
- Pour réduire le poids en vue de faciliter la manipulation, retirez tout composant amovible.

Alimentation et avertissements en matière d’électricité

Attention: Le bouton d’alimentation, indiqué par le symbole de mise en veille, NE COUPE PAS complètement l’alimentation secteur du système car le courant de veille 5 V reste actif lorsque le système est sous tension. Pour couper l’alimentation du système, vous devez débrancher le cordon d’alimentation secteur de la prise murale. Votre système peut utiliser plusieurs cordons d’alimentation secteur. Assurez-vous que tous les cordons d’alimentation sont débranchés. Vous devez les débrancher avant d’ouvrir le châssis, d’ajouter ou de supprimer un composant non connectable à chaud.

Les alimentations de certains serveurs Intel sont munies de doubles fusibles pôle / neutre: veuillez observer les précautions d'usage afin d'éviter tout risque d'eléctrocution.

N’essayez pas de modifier ou d’utiliser un cordon d’alimentation secteur s’il ne s’agit pas du type exact requis. Un cordon secteur est requis pour chaque alimentation système.

Le bloc d’alimentation de ce produit ne contient aucun composant réparable par l’utilisateur. N’ouvrez pas le bloc d’alimentation. L’intérieur de celui-ci est soumis à des niveaux dangereux de tension, de courant et d’énergie. Renvoyez-le au fabricant en cas de problème.

Lorsque vous remplacez un bloc d’alimentation à chaud, débranchez le cordon du bloc d’alimentation en cours de remplacement avant de le retirer du serveur.

Pour éviter tout risque d’électrocution, mettez le système hors tension et débranchez les cordons d’alimentation ainsi que les systèmes de télécommunication, réseaux et modems reliés au système avant d’ouvrir ce dernier.

Avertissements sur le cordon d’alimentation

Si aucun cordon d’alimentation secteur n’a été fourni avec votre produit, vous devez vous en procurer un qui soit approuvé pour une utilisation dans votre pays.

Attention: *Pour éviter tout risque d’électrocution ou d’incendie, vérifiez les cordons d’alimentation qui seront utilisés avec le produit comme suit:*

- *N’essayez pas d’utiliser ou de modifier les cordons d’alimentation en CA s’ils ne correspondent pas exactement au type requis pour les prises électriques reliées à la terre.*
- *Les cordons d’alimentation doivent répondre aux critères suivants :*
- *Le cordon d’alimentation doit supporter une intensité supérieure à celle indiquée sur le produit.*
- *Le cordon d’alimentation doit posséder une broche ou un contact de mise à la terre approprié à la prise électrique.*

- *Les cordons d'alimentation électrique représentent le principal dispositif de déconnexion raccordé à l'alimentation secteur. Les prises de courant doivent se trouver à proximité de l'équipement et être facilement accessibles pour une déconnexion.*
- *Les cordons d'alimentation doivent être branchés sur des prises électriques correctement reliées à la terre.*

Avertissements sur l'accès au système

Attention: *Pour éviter de vous blesser ou d'endommager votre équipement, les consignes de sécurité suivantes s'appliquent chaque fois que vous accédez à l'intérieur du produit:*

- *Mettez hors tension tous les périphériques connectés à ce produit.*
- *Éteignez le système en appuyant sur le bouton d'alimentation.*
- *Déconnectez l'alimentation secteur en débranchant tous les cordons d'alimentation secteur du système ou de la prise murale.*
- *Déconnectez l'ensemble des câbles et lignes de télécommunication qui sont connectés au système.*
- *Mettez toutes les vis ou autres attaches de côté lorsque vous retirez les panneaux d'accès. Une fois que vous avez terminé d'accéder à l'intérieur du produit, refixez le panneau d'accès avec les vis ou attaches d'origine.*
- *N'essayez pas d'accéder à l'intérieur du bloc d'alimentation. Il ne contient aucune pièce réparable. Renvoyez-le au fabricant en cas de problème.*
- *Mettez le serveur hors tension et débranchez tous les cordons d'alimentation avant d'ajouter ou de remplacer tout composant non connectable à chaud.*
- *Lorsque vous remplacez le bloc d'alimentation à chaud, débranchez le cordon du bloc d'alimentation en cours de remplacement avant de retirer le bloc du serveur.*

Attention: *Si le serveur a été utilisé, les processeurs et dissipateurs de chaleur installés peuvent être chauds. À moins que vous n'ajoutiez ou ne retiriez un composant connectable à chaud, laissez le système refroidir avant d'ouvrir les panneaux. Pour éviter tout risque d'entrer en contact avec un composant chaud lors d'une installation à chaud, prenez toutes les précautions nécessaires lorsque vous retirez ou installez des composants connectables à chaud.*

Attention: *Pour éviter de vous blesser, ne touchez pas les pales de ventilateur en mouvement. Si votre système est fourni avec une protection sur le ventilateur, ne mettez pas le système en route sans la protection en place.*

Avertissements sur le montage en rack

Le rack doit être fixé à un support inamovible pour éviter qu'il ne bascule lors de l'extension d'un serveur ou d'un élément de l'équipement. Le rack doit être installé conformément aux instructions du fabricant.

Installez les équipements dans le rack en partant du bas, en plaçant le plus lourd en bas du rack.

N'étendez qu'un seul élément de l'équipement à partir du rack à la fois.

Vous êtes responsable de l'installation d'un disjoncteur principal d'alimentation pour la totalité du rack. Ce disjoncteur principal doit être rapidement accessible et doit être étiqueté comme contrôlant toute l'unité, et pas uniquement le ou les serveurs.

Pour éviter tout risque d'électrocution, le rack et chaque élément de l'équipement installé dans le rack doivent être correctement reliés à la terre.

Décharges électrostatiques (ESD)

Attention: *Les décharges électrostatiques (ESD) peuvent endommager les lecteurs de disque dur, les cartes et d'autres pièces. Il est fortement conseillé d'effectuer l'ensemble des procedures décrites à un poste de travail protégé contre les ESD. Au cas où aucun poste de ce type ne serait disponible, protégez-vous contre les ESD en portant un bracelet antistatique relié à la masse du châssis (n'importe quelle surface métallique non peinte) de votre serveur lorsque que vous manipulez les pièces.*

Manipulez toujours les cartes avec précaution. Elles peuvent être extrêmement sensibles aux ESD. Ne tenez les cartes que par leurs bords. Après avoir retiré une carte de son emballage de protection ou du serveur, placez-la *sur une surface reliée à la terre, exempte de charge statique, composants orientés vers le haut. Utilisez si possible un tapi de mousse conducteru, mais pas l'emballage de la carte. Veillez à ce que la carte ne glisse sur aucune surface.*

Autres risques

Remplacement de la pile

Attention: *Il existe un risque d'explosion si la pile n'est pas correctement remplacée. Lors du remplacement de la pile, utilisez uniquement celle recommandée par le fabricant du matériel.*

Mettez la pile au rebut en vous conformant aux réglementations locales.

N'essayez pas de recharger une pile.

N'essayez pas de démonter, de percer ou d'endommager la pile d'une quelconque façon.

Refroidissement et ventilation

Attention: *Routez les câbles avec précaution comme indiqué pour minimiser les blocages de circulation d'air et les problèmes de refroidissement.*

Afin de permettre une ventilation et un refroidissement corrects, ne mettez le système en marche que lorsque les panneaux du châssis sont en place. L'utilisation du système sans les panneaux peut endommager les composants système. Pour installer les panneaux :

- Vérifiez tout d'abord que vous n'avez pas oublié d'outils ou de composants detaches à l'intérieur du système.
- Vérifiez que les câbles, les cartes d'extension et les autres composants sont correctement installés.
- Fixez les panneaux au châssis en suivant les instructions du produit.

Périphériques laser

Attention: *Pour éviter tout risque d'exposition aux rayonnements et/ou de dommage personnel:*

- *N'ouvrez pas l'enceinte d'un périphérique laser.*
- *Les périphériques laser ne sont pas réparables par l'utilisateur.*
- *Retournez-les au fabricant en cas de problème.*

Español

Información de seguridad del servidor

Este documento se aplica a las tarjetas de servidor de , las carcasas de servidor de (montaje en bastidor y en pedestal) y los dispositivos periféricos. Para reducir el riesgo de daños corporales, descargas eléctricas, fuego y en el equipo, lea este documento y preste atención a todos las advertencias y precauciones de esta guía antes de instalar o mantener el producto de servidor.

En el caso de que haya diferencias entre la información para un producto en particular contenida en este documento y la información proporcionada con dicho producto o en el sitio Web, la documentación del producto es la que prevalece.

Sólo personal técnico cualificado debe montar y prestar los servicios para el servidor.

Debe ceñirse a las directrices de esta guía y a las instrucciones de montaje de los manuals del servidor para asegurar y mantener el cumplimiento con las certificaciones y homologaciones existentes de los productos. Utilice sólo los componentes descritos y homologados que se especifican en esta guía. El uso de otros productos o componentes anulará la homologación UL y otras certificaciones oficiales del producto, pudiendo dejar de ser compatible con las normativas locales de los países en los que se comercializa.

Advertencias y precauciones sobre seguridad

Para reducir la posibilidad de que se produzcan lesiones personales o daños en la propiedad, antes de empezar a instalar el producto, lea, observe y cumpla toda la información e instrucciones de seguridad siguientes. Puede que se utilicen los siguientes símbolos de seguridad en la documentación y es posible que aparezcan en el producto o en su embalaje.

PRECAUCIÓN	Indica la existencia de un riesgo que podría causar lesiones personales o daños en la propiedad leves si no se tiene en cuenta la PRECAUCIÓN.
ADVERTENCIA	Indica la existencia de un riesgo que podría causar lesiones personales graves si no se tiene en cuenta la ADVERTENCIA.
⚠	Indica un riesgo potencial si no se tiene en cuenta la información indicada.
⚡	Indica riesgo de descargas eléctricas que podrían causar lesiones graves o la muerte si no se siguen las instrucciones de seguridad.
⚠	Indica componentes o superficies calientes.
⚠	Indica que no se deben tocar las aspas de los ventiladores, ya que de lo contrario se podrían producir lesiones.
🔌	IIndica que es necesario desenchufar los cables de alimentación de CA para desconectar la alimentación de CA
♻	Recicle por favor la batería.
🚫	Los estantes del carril se diseñan para llevar solamente el peso del sistema del servidor. No utilice el equipo montado sobre carriles como espacio de trabajo. No ponga ninguna carga adicional sobre ninguÌ n equipo montado sobre carriles.

Aplicaciones y usos previstos

Este producto ha sido evaluado como equipo de tecnología informática (ITE) que puede instalarse en oficinas, escuelas, salas de equipos informáticos o lugares de ámbito comercial similares. Es posible que sea necesario llevar a cabo una evaluación adicional para comprobar si este producto es apropiado para otras categorías de productos y entornos además de las aplicaciones informáticas (por ejemplo, soluciones médicas, industriales, residenciales, sistemas de alarma y equipos de pruebas).

Selección de la ubicación

El sistema se ha diseñado para funcionar en un entorno normal de oficinas. Seleccione una ubicación que esté:

- Limpia, seca y libre de macropartículas en suspensión en el aire (que no sean el polvo habitual de la habitación).
- Bien ventilada y alejada de fuentes de calor, incluida la luz solar directa y los radiadores.
- Alejada de fuentes de vibración o de golpes físicos.
- Aislada de campos electromagnéticos producidos por dispositivos eléctricos.
- En zonas propensas a tormentas eléctricas, se recomienda que conecte el servidor a un supresor de sobretensiones y desconecte las líneas de telecomunicaciones al módem durante una tormenta eléctrica.
- Provista de una toma de corriente alterna correctamente conectada a tierra.

- Provista de espacio suficiente para acceder a los cables de la fuente de alimentación ya que constituyen la desconexión principal de la alimentación.

Manipulación del equipo

Reduzca el riesgo de daños personales o en el equipo:

- Respete los requisitos de sanidad y seguridad laborales de su país cuando traslade y levante el equipo.
- Utilice medios mecánicos u otros que sean adecuados al trasladar o levantar el equipo.
- Para que el peso sea menor para manipularlo con más facilidad, extraiga los componentes que sean de fácil extracción.

Advertencias de alimentación y eléctricas

Precaución: *El botón de encendido, indicado con la marca del modo de reposo o stand-by, NO DESCONECTA completamente la alimentación de CA del sistema, ya que el modo de reposo de 5 V sigue activo mientras el sistema está enchufado. Para desconectar el sistema debe desenchufar el cable de alimentación de CA de la toma de la pared. Puede usar más de un cable de alimentación de CA con el sistema. Asegúrese de que todos los cables de alimentación de CA están desenchufados. Asegúrese de que los cables de alimentación de CA estén desenchufado antes de abrir la carcasa, agregar o extraer cualquier componente que no es de conexión en funcionamiento.*

Algunas fuentes de alimentación de electricidad de los servidores de Intel utilizan el polo neutral del fuselaje. Para evitar riesgos de choques electricos use precauciónes al trabajar con las fuentes de alimentación que utilizan el polo neutral de fuselaje.

No intente modificar ni utilizar un cable de alimentación de CA si no es del tipo exacto requerido. Se necesita un cable de CA para cada fuente de alimentación del sistema.

La fuente de alimentación de este producto no contiene piezas que puedan ser reparadas por el usuario. No abra la fuente de alimentación. Dentro de la fuente de alimentación puede haber niveles de tensión, corriente y energía peligrosos. Devuélvala al fabricante para repararla.

Al reemplazar una fuente de alimentación de conexión en funcionamiento, desenchufe el cable de alimentación de la fuente de alimentación que va a reemplazar antes de extraerla del servidor.

Para evitar el riesgo de descargas eléctricas, antes de abrir el servidor, apáguelo, desconecte el cable de alimentación, los sistemas de telecomunicaciones, las redes y los módems conectados al mismo.

Advertencias sobre el cable de alimentación

Si no se ha proporcionado con el producto ningún cable de alimentación de CA, adquiera alguno cuyo uso esté aprobado en su país.

Precaución: *Para evitar descargas eléctricas o fuego, revise los cables de alimentación que usará con el producto tal y como se describe a continuación:*

- *No intente modificar ni utilizar los cables de alimentación de CA si no son exactamente del modelo especificado para ajustarse a las tomas de corriente conectadas a tierra*
- *Los cables de alimentación deben reunir los siguientes requisitos:*
- *El cable de alimentación debe disponer de una capacidad nominal de corriente eléctrica mayor que la capacidad especificada en el producto.*
- *El cable de alimentación debe disponer de una patilla o contacto de conexión a tierra que sea apto para la toma de corriente.*
- *Los cables de la fuente de alimentación son los dispositivos de desconexión principales a la corriente alterna. El enchufe o enchufes de zócalo deben encontrarse cerca del equipo y el acceso a ellos debe poderse efectuar de forma inmediata con el fin de desconectarlos.*
- *Los cables de la fuente de alimentación deben estar conectados a los enchufes con una toma de tierra adecuada.*

Advertencias el acceso al sistema

Precaución: *Para evitar lesiones personales o daños en la propiedad, se aplican las siguientes instrucciones de seguridad siempre que se acceda al interior del producto:*

- *Apague todos los dispositivos periféricos conectados a este producto.*
- *Pulse el botón de alimentación para apagar el sistema.*
- *Desconecte la alimentación de CA desenchufando los cables de alimentación de CA del sistema o de la toma de corriente alterna.*
- *Desconecte todos los cables y líneas de telecomunicación que estén conectados al sistema.*
- *Guarde todos los tornillos o elementos de fijación cuando retire las cubiertas de acceso. Cuando termine de operar en el interior del producto, vuelva a colocar los tornillos o los elementos de fijación originales de la cubierta de acceso.*
- *No acceda al interior de la fuente de alimentación. No hay elementos en la fuente de alimentación que usted pueda reparar y utilizar. Devuélvala al fabricante para repararla.*
- *Apague el servidor y desconecte todos los cables de alimentación antes de agregar o reemplazar cualquier componente que no es de conexión en funcionamiento.*
- *Al reemplazar una fuente de alimentación de conexión en funcionamiento, desenchufe el cable de alimentación de la fuente de alimentación que va a reemplazar antes de extraerla del servidor.*

Precaución: *Si el servidor se ha estado ejecutando, los procesadores y disipadores de calor estarán recalentados. A no ser que esté instalando o extrayendo un componente de conexión en funcionamiento, deje que el sistema se enfríe antes de abrir las cubiertas. Para que nollegue a tocar los componentes que estén calientes cuando esté realizando una instalación de conexión en funcionamiento, tenga cuidado al extraer o instalar los componentes de conexión en funcionamiento.*

Precaución: *Para evitar posibles daños, no toque las aspas en movimiento de los ventiladores. Si el sistema se le ha suministrado con una protección para el ventilador, asegúrese de que cuando esté funcionando el sistema la protección esté en su sitio.*

Advertencias sobre el montaje en bastidor

El bastidor del equipo se debe sujetar con un soporte fijo para evitar que se caiga cuando se extraiga un servidor o una pieza del mismo. El bastidor del equipo debe instalarse siguiendo las instrucciones del fabricante del bastidor.

Instale el equipo en el bastidor comenzando desde la parte de abajo, con el equipo más pesado en la parte inferior del bastidor.

Extraiga las piezas del equipo del bastidor de una a una.

El usuario es el responsable de la instalación de un dispositivo de desconexión de la alimentación principal para toda la unidad del bastidor. El acceso a este dispositivo de desconexión deberá ser de fácil acceso y deberán incluirse indicaciones que lo identifiquen como el control de alimentación eléctrica de toda la unidad, no sólo de los servidores.

Para evitar el riesgo de descargas eléctricas, deberá instalar una conexión a tierra apropiada para el bastidor y para cada pieza del equipo instalada en el mismo.

Descarga electrostática (ESD)

Precaución: *Las descargas electrostáticas pueden dañar las unidades de disco, las tarjetas y otros componentes. Recomendamos que realice todos los procedimientos en una estación de trabajo protegida contra descargas electrostáticas. En caso de que no haya una disponible, protéjase de alguna forma contras las descargas llevando un brazalete antiestático conectado a la toma de tierra de la carcasa (cualquier superficie de metal que no esté pintada) del servidor cuando manipule las piezas.*

Manipule siempre las tarjetas con el máximo cuidado. Pueden ser sumamente sensibles a las descargas electrostáticas. Sujételas sólo por los bordes. Una vez extraída la tarjeta de su envoltorio de protección o del servidor, colóquela con el lado de los components hacia arriba sobre una superficie con toma de tiearra y sin *carga estática. Utilice unaalmohadilla de espuma conductora si dispone de ella, pero nunca el envoltorio de la tarjeta. No deslice la tarjeta sobre ninguna superficie.*

Sustitución de la batería

Precaución: *Existe el peligro de explosión si la batería no se reemplaza correctamente. Al reemplazar la batería, utilice sólo la batería recomendada por el fabricante del equipo.*

Deseche las baterías respetando la normativa local.

No intente recargar la batería.

No intente desmontar, pinchar o causar cualquier otro desperfecto a una batería.

Enfriamiento y circulación de aire

Precaución: *El tendido de los cables debe realizarse cuidadosamente tal y como se le indica para reducir al mínimo los problemas de obstrucción de la ventilación y de refrigeración.*

Para conseguir una refrigeración y corriente de aire adecuadas, compruebe que cuando sistema esté funcionando, las cubiertas de la carcasa están instaladas. Si utiliza el sistema sin las cubiertas, podría dañar sus componentes. Para instalar las cubiertas:

- *Compruebe primero que no ha dejado herramientas o piezas sueltas dentro del sistema.*
- *Compruebe que los cables, tarjetas adicionales y otros componentes están instalados correctamente.*
- *Sujete las cubiertas a la carcasa siguiendo las instrucciones del producto.*

Periféricos o dispositivos láser

Precaución: *Para evitar el riesgo de la exposición a radiaciones o de daños personales:*

- *No abra la caja de ningún periférico o dispositivo láser*
- Los periféricos o dispositivos láser no pueden ser reparados por el usuario
- Haga que el fabricante los repare.

Appendix D: Regulatory and Compliance Information

Product Regulatory Compliance

Product Safety Compliance

The Server Chassis S4R complies with the following safety requirements:

- UL60950 - CSA 60950 (USA / Canada)
- EN60950 (Europe)
- IEC60950 (International)
- CB Certificate & Report, IEC60950 (report to include all country national deviations)
- GS License (Germany)
- GOST R 60950-2002- License (Russia)
- Belarus License (Belarus)
- Ukraine License (Ukraine)
- CE - Low Voltage Directive 73/23/EEE (Europe)
- IRAM Certification (Argentina)

Product EMC Compliance - Class A Compliance

> *Note: Legally the product is required to comply with Class A emission requirements as it is intended for a commercial type market place.*

- FCC / ICES-003 - Emissions (USA / Canada) Verification
- CISPR 22 - Emissions (International)
- EN55022 - Emissions (Europe)
- EN55024 - Immunity (Europe)
- EN61000-3-2 - Harmonics (Europe)
- EN61000-3-3 - Voltage Flicker (Europe)
- CE - EMC Directive 89/336/EEC (Europe)
- VCCI Emissions (Japan)
- AS/NZS 3548 Emissions (Australia / New Zealand)
- BSMI CNS13438 Emissions (Taiwan)
- GOST R 51318.22-99 Emissions (Russia)
- GOST R 51318.24-99 Immunity (Russia)
- Belarus License (Belarus)
- Ukraine License (Ukraine)

Certifications / Registrations / Declarations

- UL Certification (US / Canada)
- CE Declaration of Conformity (CENELEC Europe)
- FCC/ICES-003 Class A Attestation (USA / Canada)
- VCCI Certification (Japan)

- C-Tick Declaration of Conformity (Australia/New Zealand)[2]
- BSMI Certification (Taiwan)
- GOST R Certification / License (Russia)
- Belarus Certification / License (Belarus)
- IRAM Certification (Argentina)
- Ecology Declaration (International)

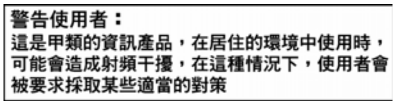
Note: Note: ¹The use of telecommunication devices such as modems and/or wireless devices, have not been planned for with respect to these systems. If there is any change of plan to use such devices, then telecommunication type certifications will require additional planning. If NEBS compliance is required for system level products, additional certification planning and design will be required. ²Quanta will be able to provide C-Tick report if the customer requesting this certification can provide their own vendor ID for declaration.

Product Regulatory Compliance Markings

This product is marked with the following Product Certification Markings:

Table 56. Product Regulatory Compliance Markings

Regulatory Compliance	Region	Marking	Note
cULus Listing Marks	USA / Canada	C US	
GS Mark	Germany	Nemko GS geprüfte Sicherheit	
CE Mark	Europe	CE	
FCC Marking (Class A)	USA	This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Manufactured by Intel Corporation	
EMC Marking (Class A)	Canada	CANADA ICES-003 CLASS A CANADA NMB-003 CLASSE A	
C-Tick Mark	Australia / New Zealand		* Quanta is able to provide C-Tick report but OEM customers will need to provide their own verdor ID to carry the C-Tick mark.
VCCI Marking (Class A)	Japan	この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A	

BSMI Certification Number & Class A Warning	Taiwan	 警告使用者： 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策	
GOST R Marking	Russia		
WEEE Mark		See the regulatory information document foradditional information.	
Recycling Package Mark	China		
Recycling Package Mark	Other than China	Corrugated Recycles	
RoHS	China		

Electromagnetic Compatibility Notices

FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class A or B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.

Industry Canada (ICES-003)

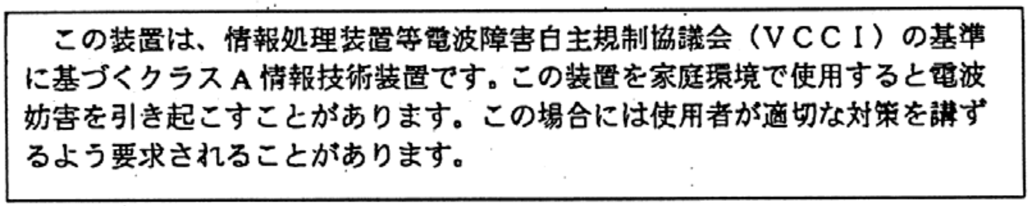
Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: “Apparelis Numériques”, NMB-003 édictee par le Ministre Canadian des Communications.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled: “Digital Apparatus,” ICES-003 of the Canadian Department of Communications.

Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

VCCI (Japan)



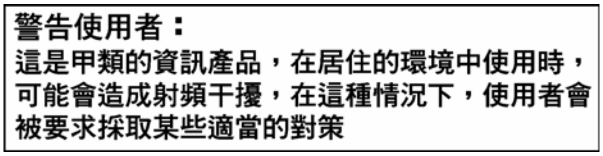
この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

BSMI (Taiwan)

The BSMI Certification Marking and EMC warning is located on the outside rear area of the product.



警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策

Regulated Specified Components

To maintain the UL listing and compliance to other regulatory certifications and/or declarations, the following regulated components must be used and conditions adhered to. Interchanging or use of other component will void the UL listing and other product certifications and approvals.

Updated product information for configurations can be found on the site at the following URL:

www.qsscit.com

If you do not have access to the Web address, please contact your local representative.

- **Add-in cards:** must have a printed wiring board flammability rating of minimum UL94V-1. Add-in cards containing external power connectors and/or lithium batteries must be UL recognized or UL listed. Any add-in card containing modem telecommunication circuitry must be UL listed. In addition, the modem must have the appropriate telecommunications, safety, and EMC approvals for the region in which it is sold.
- **Peripheral Storage Devices:** must be UL recognized or UL listed accessory and TUV or VDE licensed. Maximum power rating of any one device is 19 watts. Total server configuration is not to exceed the maximum loading conditions of the power supply.

Restriction of Hazardous Substances (RoHS) Compliance

Quanta® Computer Inc. has a system in place to restrict the use of banned substances in accordance with theEuropean Directive 2002/95/EC. Compliance is based on declaration that materials banned in the RoHS Directive are either (1) below all applicable threshold limits or (2) an approved / pending RoHS exemption applies.

RoHS implementation details are not fully defined and may change.

Threshold limits and banned substances are noted below:

- Quantity limit of 0.1% by mass (1000 PPM) for:

— Lead

— Mercury

— Hexavalent Chromium

— Polybrominated Biphenyls Diphenyl Ethers (PBDE)

- Quantity limit of 0.01% by mass (100 PPM) for:

— Cadmium

End of Life / Product Recycling

Product recycling and end-of-life take-back systems and requirements vary by country. Contact the retailer or distributor of this product for information about product recycling and / or take-back.

Appendix E: Getting Help

World Wide Web

www.qsscit.com

Appendix F: Glossary and References

Glossary

This appendix contains important terms used in the preceding chapters. For ease of use, numeric entries are listed first (e.g., "82460GX") with alpha entries following (e.g., "AGP 4x"). Acronyms are then entered in their respective place, with non-acronyms following.

Word/Acronym	Definition
ACPI	Advanced Configuration and Power Interface
ANSI	American National Standards Institute
ASL	Source Language
BIOS	Basic Input / Output System
BMC	Baseboard Management Controller
CE	Community European
CISPR	International Special Committee on Radio Interference
CMOS	Complementary Metal-Oxide Semi-Conductor
COM	Communications
CPD	Component Data Sheets
CRU	Customer Replaceable Unit
CSA	Canadian Standards Organization
D2D	DC-to-DC converter
DB	Data Bus
dBA	deciBel Acoustic
DDR-Ⅱ	Double Data Rate
DIMM	Dual In-Line Memory Module
DMA	Direct Memory Access
DPC	Direct Platform Control
DPS	Distributed Power supply
DSS	Decision Support System
DT	Double Transition
ECC	Error Checking and Correcting
EEPROM	Electrically Erasable Programmable ROM
EMI	Electromagnetic Interference
EMP	Emergency Management Port
EPS	External Product Specification
ESD	Electro Static Discharge
FCC	Federal Communications Commission
FRB	Fault Resilient Booting
FRU	Field Replaceable Unit
FSB	Front Side Bus
FWH	Firmware Hub
GND	Ground
GUI	Graphical User Interface
HDD	Hard Disk drive
HDM	High Density Metric
HL	Hub-Link
HPC	High Pin Count
HPIB	Hot-Plug Indicator Board
HSC	Hot Swap Controller
I/O	Input / Output
IC	Integrated Circuit

Word/Acronym	Definition
ICH	I/O Control Hub
ICMB	Intelligent Chassis Management Bus
IDE	Integrated Device Electronics
IEC	International Electrotechnical Commission
IMB	Intelligent Management Bus
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
ISA	Industry Standard Architecture
ISP	In System Programmable
ITE	Information Technology Equipment
ITP	In-Target Probe
JAE	Japan Aviation Electronics
JTAG	Joint Test Action Group
LAN	Local Area Network
LED	Light Emitting Diode
LPC	Low Pin Count
LVDS	Low Voltage Differential SAS
MRH-D	Memory Repeater Hub – DDR-II
MTBF	Mean Time Between Failures
NIC	Network Interface Card
OEM	Original Equipment Manufacturer
OLTP	On-line Transaction Processing
OS	Operating System
OTP	Over-Temperature Protection
OVP	Over-Voltage Protection
PAL	Programmable Array Logic
PCIe	Peripheral Component Interconnect (PCI) Express
PDB	Power distribution board
PEF	Platform Event Filtering
PEP	Platform Event Paging
PFC	Power Factor Correction
PIROM	Processor Information ROM
PLD	Programmable Logic Device
PSU	Power supply Unit
PVC	Poly Vinyl Chloride – a plastic
PWM	Pulse Width Modulator
RAID	Redundant Array of Independent Disks
RAS	Reliability, Availability and Serviceability
RH	Relative Humidity
RPM	Revolutions Per Minute
SAF-TE	SAS Accessed Fault-Tolerant Enclosure
SCA	Single Connector Attachment
SCL	Serial Clock
SAS	Small Computer Systems Interface
SDA	Serial Data
SDINT	System Diagnostic Interrupt
SDR	Sensor Data Record
SDRAM	Synchronous Dynamic RAM
SE	Single Ended
SEEPROM	Serial Electrically Erasable Programmable Read Only Memory
SEL	System Event Log
SIOH	Server I/O Hub
SMB	Server Management Bus
SMP	Symmetric Multiprocessing

Word/Acronym	Definition
SNC-M	Scalable Node Controller – McKinley
SSI	Server System Infrastructure
TTL	Transistor-Transistor Logic
USB	Universal Serial Bus
UV	Under-Voltage
VAC	Alternating current (AC) voltage
VCC	Voltage Controlled Current
VCCI	Voluntary Control Council for Interference by Information Technology Equipment
VGA	Video Graphics Array
VID	Voltage ID
VSB	Voltage StandBy
WfM	Wired For Management
ZIF	Zero Insertion Force

Reference Documents

- PCI Express ™ Base Specification Rev 2.0 Dec06 http://www.pcisig.com/
- PCI Express ™ Card Electromechanical Specification Rev 2.0 http://www.pcisig.com/
- SATA 2.6 http://www.sata-io.org/
- USB 1.1 http://www.usb.org
- USB 2.0 http://www.usb.org
- Windows Logo/SDG 3.0
- Emerald Ridge PAS
- S4R PSU SOW/Specification
- S4R PDB SOW/Specification
- S4R PRD / SOW
- S4R SMBus Diagram
- S4R Core Hardware EAS
- S4R SRD
- Quanta® BBU3 Specification
- Quanta® Rotational Vibration BKM Test Procedure
- ICH10 External Design Specification
- S4R PLD2 Specification
- EPSD Stoutland Platform BIOS EPS REV.0.86
- 403702 Thermal Throttling MRC Whitepaper
- LSI Castor Product Brief
- Refer to Intel® RMM3 Technical Product Specification or visit the links below for a detailed description of this board.

  Intel® RMM3 Technical Product Specification: http://www.intel.com/support/motherboards/server/sb/CS-030369.htm

  Intel® RMM3 User's Guide: http://www.intel.com/support/motherboards/server/sb/CS-030374.htm